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CANADA RECORDS FURTHER SUCCESS WITH THE BUFFALO

OVER SIX THOUSAND SHIPPED NORTH

Experiment of Placing Prairie Buffalo in Wood Buffalo Park Results Satisfactorily

Success has attended Canada's experiment in transferring the surplus plains buffalo from the national park at Wainwright, Alberta, to Wood Buffalo park near Fort Smith, Northwest Territories. The movement was begun in 1925 to relieve the acute grazing situation in the Wainwright reserve brought about by the rapid natural increase in the herd in that park. Each summer since then shipments have been made, and with the arrival of this year's quota of 1,057 animals, the number of plains buffalo moved north will reach slightly over 6,600. Reports from the wardens in Wood Buffalo park state that the introduced buffalo have settled down, are mingling with the wood buffalo, and now have ample feed, water, and natural shelter. The herd at Wainwright has now been reduced to a little over 5,000 animals, which for the present is considered within the grazing limits of that park.

Few, if any, of the chapters on wild life conservation in Canada contain such a thrilling story as that of the buffalo. From the proud position of "lord of the plains" when he was numbered in millions, the buffalo was brought to the verge of extinction. To-day by the forethought which made possible the establishment and development of the great herd by the Department of the Interior at Buffalo national park, Wainwright, and the protection of the wild herd near Fort Smith, Northwest Territories, the buffalo has "come back" and the future of this great mammal in Canada is assured.

The bison was once the outstanding big game animal of North America. Its huge bulk, its enormous battering ram head, its splendid chest and shoulders covered with a magnificent shaggy coat of dark brown hair, all combined to make it in the words of a well known naturalist, "the grandest ruminant that ever trod the earth." Of all the large quadrupeds that have ever lived no species, it is said, has existed in such enormous numbers and few have equalled it in value to man. To the Indians and early settlers of the western half of the continent the buffalo meant food, clothing and shelter. Its meat was as well flavoured and as nutrious as the finest of beef; its thick robe

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GARDENING ON THE PRAIRIES

Shelterbelts on Farms in Western Canada Greatly Assisting Horticultural Development

There are few districts in Canada where finer vegetables can be grown than in the Prairie Provinces provided the garden is well protected from the strong winds. The same thing applies to small fruits such as currants and raspberries where proper cultural methods are employed. The growing of tree fruits is, however, a much more recent development. While it is not expected that apples and plums will for many years be raised in commercial quantities on the prairies, there is enough evidence to demonstrate quite conclusively that in most of the settled sections it is quite possible for a farmer to raise sufficient fruit for home requirements.

Gardening on the Prairies—Photograph of a section of the orchard at the Forest Service nursery station at Indian Head, Saskatchewan, showing Aitkin plum trees in bloom.

As a result of the tree planting campaign which has been carried on since 1901 by the Tree Planting Division of the Forest Service, Department of the Interior, thousands of prairie farms are now completely protected by well established shelterbelts. It is interesting to note the effect of these shelterbelts in respect to the general development of farm horticulture. Without protection it is practically impossible to get good results under prairie conditions with vegetable and other garden crops. Twenty-five years ago one could drive for miles through the farming districts and seldom see a good farm garden; in fact the majority of farmers made but little attempt to grow many vegetables other than a few potatoes, and only a few planted small fruits such as currants and raspberries. The growing of apples and plums was practically unheard of and was generally considered to be an impossibility. However, the advent of the shelterbelt has gradually worked a great change in these conditions. Last season an inspection of approximately 7,600 farms on which shelterbelts had been established showed that 6,800 had good vegetable gardens, 2,700 were growing small fruits, and about 600 were experimenting with either apples or plums or both.

The late A. P. Stevenson of Morden, Manitoba, undoubtedly did more than any other private experimenter in demonstrating the possibility of growing tree fruits in Manitoba. He propagated and sold large numbers of young trees of varieties which he found hardy, mostly of Russian origin, and of recent years reports of planters ripening standard apples have been received from widely separated points in the three Prairie Provinces.

On the Dominion Government's nursery station at Indian Head, apples and plums originating from the Stevenson nursery were planted nearly twenty years ago and additions made from time to time. Reasonable crops of fruit have been secured quite regularly. In some seasons over 1,500 pounds of plums and 1,700 pounds of standard apples have been picked. The apples which have been given most general satisfaction are the Hibernal,

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PRESERVING AND RESTORING OUR HISTORIC SITES

PIONEER DAYS IN CANADA RECALLED

Marking of Sites of National Importance Carried Out by Department of the Interior

Canada's historical background contains some of the most romantic and interesting episodes in the history of North America. In many districts throughout the Dominion there still remain visible evidences of our history in ruins which have been preserved, but there are scenes of other and often important actions and events which are unmarked by any physical reminder of what transpired at these points. The Department of the Interior has been carrying on a valuable work in preserving and restoring the ruins and suitably marking the sites of national historic importance. As a result along many of the main motor highways of the Dominion artistically designed cairns and tablets give motorists and tourists a peep into our romantic past.

On the recommendation of the Historic Sites and Monuments Board, the Department of the Interior, through the National Parks Service, has marked 118 sites by the erection of suitable memorials. Each year at the annual meeting of the Board the suggestions of the various members are reviewed and a number of sites are recommended for marking. During 1927 tablets were placed on twenty-five sites and one of the most picturesque ceremonies in this connection was the unveiling of the cairn and tablet at Blackfoot Crossing, near where the Cluny-Milo section of the Alberta Provincial Highway crosses the Bow river. This memorial commemorates the signing on September 22, 1877, near this point, of Treaty No. 7 by which the wide plains were thrown open to the white man and peace and security was assured the Indians. The unveiling took place on the fiftieth anniversary of the signing, the principals in which were: Hon. David Laird and Lt.-Col. James F. Macleod, representing the Crown; and the famous Indian leader, Chief Crowfoot, and other chiefs and councillors of the Blackfoot, Blood, Peigan, Sarcee, Stony, and other Indians. The Red Men relinquished their claim to 50,000 square miles of fertile prairie in southwestern Alberta by this treaty. The site of the memorial is also near the grave of Chief Crowfoot.

Indian treaties signed in each of the other Prairie Provinces, Manitoba and Saskatchewan, are also to be com-

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MANY OF THE STARS PROVED TO BE DOUBLE

Spectroscope at Dominion Astrophysical Observatory Reveals Interesting Data

To the layman the connection between the earth's resources and astronomy is not at once evident. But when one recalls that the vast reserve of energy stored in our coal deposits and oil-fields, the potential power of our water-falls, and the activity visible in the profusion of vegetable and animal life which abounds everywhere, have been derived from the sun, it is evident that we cannot know too much about this storehouse of energy upon which we are ultimately so dependent. In the pursuit of further knowledge astronomers are brought into close contact with the still more remote stars and systems of bodies which occupy space, and many features of the universe which appear startling and incomprehensible to the average person are but common-place, work-a-day facts to the astronomer. To the latter, the sun is an ordinary star overshadowed in the infinite by other stars of much greater intensity and immensity.

It will be a matter of surprise to the general public to learn that a considerable proportion of the stars which appear to the unaided eye as single are in reality double, that is, made up of two component stars revolving around a common centre of gravity. As a matter of fact practically one star out of eighteen, when viewed through our large telescopes is seen to be double instead of single and much knowledge of the masses and other physical characteristics of the stars has been derived from the study during the past one hundred and fifty years of these visual double stars or, as the astronomer terms them, binary systems.

However, the range of any telescope is limited, and it hence seems possible that many stars, seen as single even in the most powerful telescopes, may yet in reality be double. By the application of the spectroscope—probably the most powerful engine of research yet devised—to the telescope this possibility becomes an actuality, for one phase of spectroscopic analysis enables the velocities of the stars towards or from us to be accurately measured. It is found that the velocities of many of the stars instead of being constant, as they should be if the stars were single, vary periodically through a wide range, thus indicating conclusively that the star observed has an invisible companion, each component revolving around the common centre of gravity of the pair. By this means in the past thirty-five years the number of binary stars has been vastly increased, over 1,200 spectroscopic binaries as they are called having been discovered by aid of the spectroscope. It is now believed that one star in every four or five is in reality a double star as compared with one in every eighteen which can be seen as double in the telescope. Not only that, but the circumstances of the motion of nearly 300 of these binaries have been determined by observations with the spectroscope, so that we know the time required for the revolution, the shape of the orbit and, in many cases, its size and the masses of the component stars of systems which no telescope can visually reveal as anything but single stars.

In the discovery of these spectroscopic binary systems and in the determination of the circumstances of their orbital motion, including their masses and other physical characteristics so important in the study of the universe, the Dominion Astrophysical Observatory at Victoria has occupied the premier position among the observatories of the world since its establishment nine years ago.

Marking Our Historic Sites—Unveiling of the memorial at Blackfoot Crossing, Alberta, commemorating the signing of Indian Treaty No. 7. Mrs. J. F. Macleod, whose husband, the late Colonel Macleod, was one of the Crown's representatives at the signing of the Treaty, is seen pulling the cord which unveiled the cairn and tablet.

PRESERVING AND RESTORING OUR HISTORIC SITES

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memorated. Treaty No. 1 was signed at Lower Fort Garry, Manitoba, on August 3, 1871, and Treaty No. 6 at Fort Carlton, Saskatchewan, between the 23rd and 28th of August, 1876, and at Fort Pitt on September 9, 1876.

Recently the 1928 annual meeting of the Historic Sites and Monuments Board was held at Ottawa. One hundred and ten sites were reviewed and a number were selected to be marked as of national importance. Brigadier General E. A. Cruikshank, who is a recognized authority on the military history of Canada and is chairman of the Board, presided at the meeting. The other members in attendance were, Dr. J. C. Webster, Shediac, New Brunswick; Judge W. Crowe, Sydney, Nova Scotia; Hon. P. Demers, Montreal, Quebec; Dr. J. H. Coyne, St. Thomas, Ontario; Judge F. W. Howay, New Westminster, British Columbia, representing Western Canada; Mr. J. B. Harkin, Commissioner, National Parks of Canada, representing the Department of the Interior; and Major A. A. Pinard, Secretary.

Of the new sites or events selected for commemoration the following are the most outstanding:—

Hillsborough, New Brunswick.—Site of the Battle of the Petitcodiac, August, 1755. This was the last action in connection with the removal of the Acadians.

Sydney, Nova Scotia.—Political reunion of Cape Breton and Nova Scotia, October 16, 1820.

St. Johns, Quebec.—Site, near here, of the Battle of Montgomery's Creek, September 6, 1775, with Montgomery's invading army. The defeat of the invaders had the effect of repelling a formidable invasion for the time being and created great enthusiasm in the country.

Nanticoke, Haldimand County, Ontario.—On 13th November, 1813, the Norfolk volunteer militia, routed a band of marauders who had terrorized the country. This exploit inspirited the military forces, restored the confidence of the people, and was an important factor in the immediate recovery of lost ground.

Fort Drummond, Queenston Heights, Ontario.—Fort built by military labour for the defense of the frontier in 1814 and named in honour of Sir Gordon Drummond.

Niagara-on-the-Lake, Ontario.—Commemorating the treaties concluded with the Chippawa and Mississauga Indians by Colonel Guy Johnson, May 9, 1781, and Lt.-Col. John Butler, May 22, 1784.

Kingston Navy Yard, Kingston, Ontario.—The British naval station for lake Ontario during the years 1788-1818. Here were built fourteen King's ships. In the war of 1812-14 this naval force enabled the army to retain control of Upper Canada.

Amherstburg Navy Yard, Amherstburg, Ontario.—The British naval station for lakes Erie and Huron during the years, 1796-1813. Here nine King's ships were built. In the war of 1812-14 this naval force enabled the army to retain control of that frontier.

Fort Fork, Alberta.—Situated near the junction of Great Smoky and Peace rivers and erected by Sir Alexander Mackenzie, 1792-3. It was from this fort that he started on his perilous and historic journey to the Pacific.

In addition to the above the Board also recommended that the eminent public services of the following outstanding personages in Canadian history should be suitably commemorated:—

Three Rivers, Quebec.—Benjamin Sulte, outstanding historian and poet. Born, Three Rivers, September, 1841; died, Ottawa, August, 1923.

Annapolis Royal, Nova Scotia.—Samuel Vetch, adjutant-general of the force which captured Port Royal, 1710. First Governor and Commander-in-Chief.

Toronto, Ontario.—Sir Gordon Drummond, a successful and talented military commander who served with distinction in the war of 1812, and who administered the civil affairs of Upper and Lower Canada at critical times.

In addition to the marking of historic sites, a number of outstanding military ruins have been restored and in each case a certain area surrounding them has been set aside as a national park. These historic places have proved of exceptional appeal and interest and thousands of tourists visit them annually.

ORIGIN OF A FAMOUS ALBERTA PLACE-NAME

How a Rocky Mountains Pass and Other Features Came To Be Called Crowsnest

One of the best known place-names in Alberta is Crowsnest, which is familiar as the name of a mountain, a pass, a lake, a river, and a village. The name according to the Geographic Board of Canada is first mentioned by Capt. Thos. Blakiston of the Palliser Expedition, whose report of December 15, 1858, refers to "Crow-nest pass" and "Crow-nest river". The map accompanying the final report of the Expedition and published in 1865 shows "Crow's Nest mountain". The mountain name is the original one and refers to the nesting place of crows or ravens, in Cree, *ka-ka-iu-wut-tshistun*, in Blackfoot, *ma-sto-eeas*.

The mountain, as known to the white man, is located in latitude 49° 42′, longitude 114° 34′, but the hill to which the Indians gave the name would seem to be about eighteen miles further east, for, about twenty-two years ago an aged Blood chief, Ermine Horse, guided Mr. R. N. Wilson, Indian agent, to the scene of the murder of two white miners, by himself and some companions, in his early life. He had stated that it was a crow's nest, but to Mr. Wilson's surprise headed for a high, isolated and prominent hill standing between the Porcupines and the Rockies, and some few miles north and east of the eastern entrance to the Crowsnest pass. He said this is what the Indians called "crow's nest" (literally speaking, the "ravens' home") pointing to the timbered, rocky top. Mr. Wilson questioned him about the pass and also that mountain which white men call the Crowsnest. To this he replied "That perhaps is the white man's talk. We Indians know but one 'crow's nest' and this is it," and, waving his arm about, "all Indians refer to this locality as the 'crow's nest country'". This would account for the name being extended to the neighbouring river and pass.

While Crowsnest may not occur today elsewhere in Canada as a place-name, Peter Fidler's map, 1816-17, shows a place of that name on Nelson river, Manitoba; and John Long, the fur-trader, who described his travels in the region north of lake Superior in a book published in 1791, mentioned two Crowsnest lakes, one near lake Abitibi and the other west of lake Nipigon, specifically stating that they designate localities where crows build their nests.

Water-Power Resources

The official information available at a central source regarding the water-power resources of Canada, as to capacity and availability is most complete. The Index Inventory System of investigating and recording water-power resources, originated by the Dominion Water Power Branch of the Department of the Interior and developed and carried out in full collaboration with the provincial governments, has resulted in all possible information on this subject respecting any river or district being available at the head office in Ottawa for any interests concerned.

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CANADA RECORDS FURTHER SUCCESS WITH THE BUFFALO

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furnished covering and clothing against the bitter winter cold; its hide was used for tepees and boats while its horns, hair, hoofs, and bones furnished many articles of use and adornment.

The species is believed to have arrived on this continent in mid-Pleistocene times or during the warm inter-Glacial period. It probably crossed from Asia by the northern land route and gradually spread southwards until it covered more than one-third of North America. At the time of the arrival of white men on this continent, the buffalo roamed in great armies some of which are recorded as moving forward on a front not less than 25 miles in width and 50 miles in depth.

While the tribes of the West practically subsisted on the buffalo, the destruction the Indians caused was inconsiderable and never equalled the annual increase of the herds. With the arrival of the white man, however, with his more efficient weapons, a disasterous inroad upon the species began.

The complete extermination of the buffalo came about so quickly that even those who had best reason to know did not realize what was happening. In 1875 buffalo were plentiful, by 1885 they were growing scarce, by 1890 they were practically gone. In 1900 so far as was known there was not a single wild buffalo left in Canada with the exception of one herd of the so-called "woodland type" which had its feeding grounds in the then almost inaccessible country south of Great Slave lake. This is the area which has been set aside as Wood Buffalo park and in which this last remaining wild herd has grown to approximately 1,500 animals.

In 1907 the Dominion Government had an opportunity to purchase a pure-bred herd from Michael Pablo, of Montana, U.S.A. Pablo was a shrewd half-breed who had developed a considerable herd from an original nucleus of 4 calves captured on the plains. As his range was being taken from him by settlement, he was anxious to dispose of his herd and made an offer to Canada. The Rt. Hon. Sir Wilfrid Laurier, who was then Prime Minister, was of the opinion that this interesting native animal should not entirely disappear from Canada and the Government agreeing, it was decided to purchase the herd and place it in a reserve where the animals could live without molestation.

The undertaking was, however, much more difficult than was anticipated. The task of rounding up and loading the animals required all the efforts and ingenuity of Pablo and his cowboys for three years. The first year's shipment consisted of about 300 animals, and in the next two years about 400 additional head were secured. By this time the great fenced reserve at Wainwright, approximately 15 miles long and 13 miles wide, was ready for occupation and the buffalo were turned loose to feed, as their ancestors had done, on the rich buffalo grass of Alberta. Here, in the twenty years of their so-called captivity, the herd has thriven so successfully that the original 709 have increased to 15,000, of which over 5,000 are now in the park; the remainder having been sent to other parks or disposed of in various ways. As already explained slightly over 6,600 buffalo have been sent to the Wood Buffalo park, Northwest Territories, which with the 1,500 wood buffalo there and the annual natural increase brings the estimated total in that reserve to approximately 9,000.

From time to time a certain number of those at Wainwright have been slaughtered and a commercial disposition made of the meat, heads, and robes. Experiments in cross-breeding buffalo, yak, and domestic cattle are being carried out at Buffalo park, Wainwright, and some extremely interesting results have been secured, indicating that a new breed of animal containing a fair percentage of buffalo blood and therefore of a hardier type than ordinary domestic cattle and capable of "rustling" for itself in the winter months may be obtained.

Canada's venture with the buffalo has succeeded beyond the hopes of the most optimistic of its early supporters. Sixteen years after the purchase of the Pablo buffalo the herd had outgrown the grazing possibilities of the Wainwright reserve. The experiment of shipping part of the surplus animals to Wood Buffalo park, Northwest Territories, has also resulted satisfactorily. There is now good reason to suppose that it will result in the restocking with these valuable big game animals of the unsettled lands of the Canadian North, in the development of which they may yet play, as they did in the development of our Canadian West, an important and historic part.

A MATCHLESS NATURAL RESOURCE

Among the natural assets of North America none is more noted than the St. Lawrence-Great Lakes chain, forming collectively the world's largest body of fresh water. Every student of Canadian exploration and settlement is familiar with the unique role played by this waterway in Canada's early development. Its modern contribution to the economic life of the Dominion is equally remarkable, though it cannot be measured by financial figures such as those for the annual wheat crop, gold output, lumber cut and so on, which so vividly reflect the productive value of the prairies, mineral regions, forests, and other great natural sources of wealth.

Perhaps the most striking testimony to the vital relation of this waterway to Canadian industry and commerce to-day is furnished by the series of cities and towns aligned along its course. According to the last census there were roundly 2,800,000 people in Canada living in cities with a population of 10,000 or more. And nearly 60 per cent of this aggregate was accounted for by the numerous cities which are situated along the St. Lawrence-Great Lakes system and which owe their progress largely to the industrial and commercial advantages of such a location. The towns and cities strung out at varying intervals between Quebec and the head of the lakes are credited with more than half of the total value of Canada's annual production of manufactures.

Of the total area of Canada, 1,200,000 square miles (approximately one-quarter of the whole) is forest land. Less than half of this carries timber of merchantable size (6 inches in diameter) at the present time, and only about one-quarter carries saw material (10 inches in diameter).

Possibly the greatest appeal of the Canadian national parks lies in the fact that notwithstanding the many conveniences introduced for the comfort of travellers through these immense virgin areas, none of the lure of the unknown has been lost. Primeval forests, peopled by hundreds of wild birds and animals, creep down to the towns in the parks and border the roads and trails. The beautiful lakes teem with fish, and the upland gardens are masses of wild-flowers. Here, surely, is the tourist land ideal, where the mental and physical man may be refreshed and invigorated.

PREPARATIONS MADE FOR ARCTIC PATROL

SS "Beothic" Will Sail July 18 With Annual Canadian Government Expedition

The patrol ship *Beothic* will sail from North Sydney, Nova Scotia on July 18 carrying the Dominion Government's 1928 expedition to the Canadian Arctic islands. Arrangements for the annual visit of the ship to the posts in the northern archipelago have been practically completed by officers of the North West Territories and Yukon Branch of the Department of the Interior. The *Beothic* was placed in dry dock at St. John's, Newfoundland, after its return from the fishing grounds and completely overhauled. Heavier plates were placed on certain parts of the *Beothic* to withstand the action of the ice, and other parts of the vessel were strengthened so that when it is taken over by departmental officers on July 14 the ship will be in first class condition.

This year's expedition will again be in charge of Mr. George P. Mackenzie and others making the trip north include, Dr. L. D. Livingstone, who will spend a year in medical patrols on Baffin island; Mr. J. D. Soper, investigator for the North West Territories and Yukon Branch into wild life and native conditions; Dr. R. M. Anderson of the National Museum; Mr. R. S. Finnie, secretary to the officer in charge; Mr. R. T. Bowman, general assistant; Capt. E. Falk, ship's master; Capt. J. D. Morin, ice pilot; Mr. E. J. Mead, wireless operator; and Inspector A. H. Joy and seven other officers of the Royal Canadian Mounted Police going north to relieve officers who have completed their tour of duty at the posts.

When the ship sails from North Sydney, the first port of call will be Godhavn, Greenland, where courtesies will be exchanged with the Danish officials. The ship will then proceed to Pond Inlet, Baffin island; Dundas Harbour, Devon island; Craig Harbour and Bache Peninsula, Ellesmere island. Bache Peninsula is the farthest north police post, customs house, and post office in the world. At this point the ship will begin its return journey, re-visiting Craig Harbour, Dundas Harbour, and Pond Inlet, and then moving on to Pangnirtung and Lake Harbour, Baffin island.

The Forest and Our Railways

Railways and forests in Canada are closely allied. There are nearly 40,000 miles of railway in the Dominion and they are large users of wood, since they require annually over fourteen million ties as well as other classes of timber, while, on the other hand, the products of the forest furnish one-fifth of the freight tonnage handled by these railways.

The journey by motor car over the entire length of the Banff-Windermere highway through the heart of the Canadian Rockies can be made comfortably in one day. The route lies through virgin wilderness, but rest camps, automobile camping grounds, bungalow camps, and service stations are located along the way in such numbers as to guarantee accommodation for those who wish to make a more leisurely survey of the road.

WORK OF PHYSICAL TESTING LABORATORY

Instruments of High Precision Required for Greatest Possible Accuracy in Surveying

The surveying and mapping of our Dominion demands, among other things, the use of scientific instruments of a high degree of precision. Accuracy is one of the primary requisites in carrying on such work, and this can only be attained by the use of instruments of the highest possible precision and their periodical overhauling to ensure accuracy of adjustment. As an aid, therefore, to the actual work in the field, there must be carried on the standardization of instruments, the determination of their index corrections, if any, and in some cases the necessary experimental work and tests that lead to the improvement in design and the development of new features or accessories to deal with various problems as they arise.

In the field work of the Topographical Survey of the Department of the Interior, a large number of instruments are used. These range in variety from the simple to the complex. In order to keep these instruments properly standardized and particularly in order to see that they fulfil the set requirements at the time of their purchase, the Physical Testing Laboratory of the Topographical Survey was instituted. The laboratory has now been in existence some sixteen years.

Two special buildings were erected and equipped and immediately became of use not only for dealing with new instruments but for adjusting those in service, determining their constants, etc. The facilities for verifying measures of length were installed to comply with the Dominion Lands Act which directs the Surveyor General to verify the accuracy of Dominion Land Surveyors' standard measures.

A fundamental dimension entering into nearly all measurements is length. The laboratory is equipped with precise standard rules, verified directly against prototypes of the Imperial Yard and the International Metre and whose absolute lengths are probably known to a precision of one fifty-thousandth of an inch. In the experiments made at the laboratory the relative lengths of two rules can be determined to an even greater accuracy. To carry out the process of transferring lengths from the standards to the actual working measures, very accurate apparatus is required and the building must be especially erected for that purpose. Some of the precise observations entailed in these comparisons require several days' work on the part of skilled scientific workers before they are completed. One important application of this portion of the laboratory activities is the measurement of the thermal expansion of measures and of various materials.

Arising directly out of this work it became essential to provide facilities for the testing of the thermometers used in verifying the measures of length, and later special equipment became necessary for testing and adjusting aneroid barometers and other instruments.

In Canada low temperatures are encountered during the winter and it is important that instruments should, in some cases, be standardized and tested at the temperatures at which they will be used. For this purpose the laboratory is equipped with a refrigerating machine for cooling large testing chambers down to temperatures as low as 40° below zero.

Modern research has enabled the physicist to make accurate temperature measurements, all referred to a temperature standard as real as the standard yard or metre to which length measurements are referred. As in the case of length, precise standards and comparing apparatus are required for standardizing the thermometers used in practice. The standards of the laboratory comprise both mercury thermometers and also electrical thermometers by means of which temperature measurements are made from changes in the qualities of platinum wire. One of these latter instruments has such a wide range that it will indicate with equal accuracy temperatures of 100° below zero and 1000° above zero. The laboratory tests thousands of thermometers annually. Some of these are for very accurate work where temperatures have to be measured to the thousandth part of a degree.

Optical instruments are very widely used and an important development of the laboratory work is the testing of telescopes, binoculars, rangefinders and allied instruments. In this section of the laboratory tests are also made of theodolities, levels and other surveying instruments as well as the cameras used in photographing Canada from the air.

Barometers and aeronautical instruments are standardized in another part of the laboratory. Here are standard barometers, pumps, thermal chambers and other apparatus permitting exhaustive tests to be made of barometers, air speed indicators, pressure gauges, and other allied instruments. Other instruments standardized are hydrometers for determining the density of liquors, oils, etc.; chronometers, and watches; hygrometers for testing the amount of moisture in the atmosphere; standard sieves for testing cement; and spirit levels.

Soon after the establishment of the laboratory requests were received from other departments and from the public for testing work to be carried on, and these were acceded to whenever possible. The laboratory now covers a wide field of testing and standardization work, and also undertakes the construction of special instrumental equipment and the repairs of instruments for other departments. In addition, it conducts original investigations and research relating to the design and improvement of instruments.

Gardening on the Prairies—Blushed Calville apples are one of the best producers of the varieties suitable for prairie planting. The above illustration shows 364 pounds of these apples taken from seven young trees at the Indian Head nursery station of the Forest Service, Department of the Interior.

GARDENING ON THE PRAIRIES

(Continued from page 1)

Blushed Calville and Patten's Greening; while among the best plums are Aitkin, Stevenson's Mammoth, Cheney, and Winnipeg. One of the chief difficulties to contend with is rabbit injury and it is doubtful whether success can be secured unless the trees are protected by a rabbit-proof fence. A good windbreak of trees is absolutely essential.

Conditions for fruit growing are not equally favourable all over the three provinces. Varieties which are hardy in southern Manitoba and southeastern Saskatchewan are not found to be hardy in areas farther north and west. It is safe to predict, however, that by cross-breeding, varieties will eventually be produced suitable to all districts. It is only of comparatively recent years that much attention has been paid to the breeding of hardy fruits for the Canadian prairies but a great deal of work along these lines is now being carried on under the supervision of Mr. W. T. Macoun, Dominion Horticulturist, Ottawa, at the Dominion Experimental Farms at Morden, Man. and Rosthern, Sask.; also at the University of Saskatchewan at Saskatoon, and results so far are very encouraging.

HOW BERNARD RIVER GOT ITS NAME

In 1828 Sir George Simpson, governor of the Hudson's Bay Company crossed Canada from east to west by way of Peace river. At half past six on Sunday evening, September 7, the travellers laid aside their paddles to camp for the night at the mouth of a small tributary to Peace river, not far below where the latter river divides into two main branches, the Finlay and the Parsnip. In disembarking from large canoes, passengers had generally to be carried from the canoe to the shore. Sir George Simpson's guide, Bernard, was carrying the Governor ashore when he fell with him into the water. Since that day the river has borne the name Bernard and all that is known of the guide is that he was the principal figure in this incident. The name Bernard river has just been approved by the Geographic Board of Canada.

REGULATIONS

PETROLEUM AND NATURAL GAS

With a view to encouraging the development of Canada's resources in petroleum and natural gas a number of important changes have been made in the Petroleum and Natural Gas Regulations relating to Dominion lands outside the Northwest Territories. On the recommendation of the Honourable Charles Stewart, Minister of the Interior, an Order in Council, dated May 7, 1928, was passed amending the regulations so as to provide for the issue of permits to conduct preliminary prospecting operations in advance of the issue of a lease.

Heretofore applicants for petroleum and natural gas rights were required to obtain a lease and make payment in advance of the rental for the first year. Under the amended regulations the permittee has the privilege of applying four-fifths of the first year's rental to the cost of development work, provided he complies with the regulations.

The application for a permit should be filed in the same manner as an application for a petroleum and natural gas lease, and the procedure is similar in both cases.

A fee of five dollars must be paid, together with the rental at the rate of ten cents per acre, when the application is filed, but the application has to be accompanied by a cash bond amounting to forty cents per acre. The latter is to guarantee an expenditure during the term of the permit, in actual core drilling or other like operations on the location for the determination of the geological structure, of a sum equal to the amount of the cash bond. The bond shall be subject to forfeiture unless evidence is furnished that the expenditure has been made.

The permittee may relinquish his permit provided the expenditure required has been made, and he shall have the exclusive right, before the termination of the permit or earlier, to apply for a lease of the petroleum and natural gas rights.

Provision is made for the acceptance of expenditures which may be placed to the credit of the permittee and may be applied on rental on petroleum and natural gas leases. If a permittee does not exercise his rights to a lease of the area, notice shall be posted in the office of the Agent of Dominion Lands making the lands available under the regulations.

A statement respecting the proposed operations by a permittee shall be submitted to the proper officers of the Department, and he shall furnish the Department with geological and other data obtained as the result of the operations, together with the logs of the wells drilled. Expenditure incurred in operations on privately owned lands adjacent to areas under permit shall be accepted provided data is furnished officers of the Department.

A permittee may relinquish his permit when the Minister is satisfied that further expenditures would not be warranted, and the bond will be released. He may assign his permit, but not without the consent of the Minister, and the permit may be cancelled and the bond forfeited in default of compliance with the terms and conditions under which it was granted.

These regulations are distributed by the Dominion Lands Administration, Department of the Interior, Ottawa, or may be obtained at the office of any Agent of Dominion Lands.

NATURAL RESOURCES CANADA

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VOL. 7 AUGUST, 1928 NO. 8

CONTINUE EFFORTS TO CONTROL WOLF MENACE IN N.W.T.

NEARLY 1,300 DESTROYED IN 1927-28

Increased Bounty Encourages Hunt for These Animals Which Endanger Natives' Food Supply

The welfare of the native population of northern Canada, Indian and Eskimo, continues to receive careful attention from the Dominion Government. The important part which the natives of the Far North, particularly the Eskimos, must play in future development within the Arctic circle has long been realized and the Department of the Interior, through its North West Territories and Yukon Branch has been putting forth every effort to improve conditions among these wards of the Government. Investigations are now under way in various parts of the Northwest Territories, with a view to aiding the natives to meet the changing conditions brought about by the advance of civilization in the northern regions. One of the principal effects of the new conditions has been the rapid disappearance of the wild life on which the natives depended for their food and clothing The introduction of modern firearms and methods of hunting have been held largely responsible for the destruction of the wild life. However, in recent years wolves have been reported as taking a heavy toll of wild life, particularly caribou, and the controlling of this menace is one of the problems that is receiving the attention of the North West Territories and Yukon Branch.

The danger of the wolf menace and the need for controlling these predatory animals were early realized. Various experiments were tried by the Department of the Interior but none was as efficient as desired. In 1924 it was decided to increase the bounty on wolves from $20 to $30. Prior to that year the trapper received the bounty and was allowed to retain the pelt. However, the amended regulations require that he turn in the pelt to the Department, whose property it becomes. The success of the new bounty is reflected in the increased number of wolves destroyed since 1924, as shown by the following record compiled in the North West Territories and Yukon Branch.

Table showing (A) numbers of wolf pelts on which bounties were paid by the Government; (B) the numbers of pelts sold to traders on which no bounties were paid; and (C) the total numbers of wolves destroyed in the fiscal years indicated.

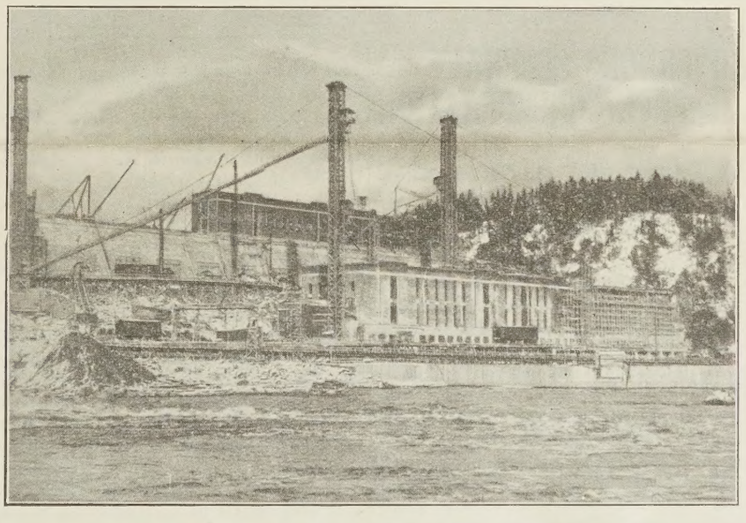
Year	A	B	C
1924-25..	276	361	637
1925-26..	576	271	847
1926-27..	680	243	923
1927-28..	974	318	1,292

(Continued on page 2)

MID-SEASON REVIEW OF POWER DEVELOPMENT IN CANADA

Department of the Interior Estimates 550,000 Horse-power Will Be Added in 1928

The annual statement of the Honourable Charles Stewart, Minister of the Interior, with regard to the progress of water-power development in Canada, issued at the beginning of the year predicted an addition of 378,000 h.p. to the total installation in the Dominion during the first six or seven months of 1928. A mid-season review of conditions now indicates that during the whole year as much as 550,000 h.p. will be added, either in new developments or in additions to existing stations. There are also many undertakings in the initial stages of construction and others in active prospect which on completion will add a further 2,000,000 h.p. to the installation in the Dominion within the next few years. This new work will require a direct investment of at least $200,000,000.



Water-power Development in Canada—Construction of the Gatineau Power Company's plant at Paugan Falls, on the Gatineau river, Quebec, is rapidly nearing completion and the initial installation of six 34,000 horse-power units will be in operation this year. The Paugan Falls plant is the largest of the three developments of the Gatineau Company on the Gatineau river.

It is not possible in a brief review to mention each active or prospective hydro-electric enterprise in Canada so that the outline given here refers only to some of the larger undertakings.

In British Columbia the Bridge River Power Company, a subsidiary of the British Columbia Electric Railway Company, is driving a tunnel 2½ miles long and 12 feet in diameter from the Bridge river to the power station on Seton lake where an initial installation of two 56,000 h.p. units is to be completed by the end of 1930. This work is part of a comprehensive enterprise for the Bridge river with an ultimate designed capacity of 500,000 h.p. Another large development under construction in British Columbia is the new 60,000 h.p. station of the West Kootenay Power and Light Company on the Kootenay river at Slocan. In the prospective class may be mentioned two projects to develop power for pulp and paper industries, namely a 70,000 h.p. station on the Campbell river by the Canadian Crown Willamette Co., Ltd., and a 60,000 h.p. development on the Nimpkish river by the Canadian Forest Products Limited.

In Alberta, the Calgary Power Company is undertaking the development of the Ghost site on the Bow river about 33 miles west of Calgary where between 20,000 and 30,000 h.p. will be developed to meet the increased demand for power brought about by the Company's extensive program of expansion which contemplates serving many municipalities in southern Alberta.

In Saskatchewan, no hydro-electric development has yet taken place but the first is now in active prospect at Island Falls on the Churchill river where the Whitney mining interests contemplate the early development of 40,000

(Continued on page 3)

EARLY TRAFFIC TO NATIONAL PARKS BREAKS RECORDS

MOTOR TRAFFIC GROWS RAPIDLY

Canada's Great Scenic Playgrounds Increasingly Attractive to Visitors

The present season promises to be one of the busiest from the tourist point of view yet experienced in the national parks. Although the season has only begun, already many records for attendance have been broken and indications point to an increasing flow of traffic during the next two months. The fine addition to its Banff Springs hotel, erected by the Canadian Pacific Railway Company to replace the old wing destroyed by fire a couple of years ago, has made this hotel one of the finest and most complete of its kind on the continent. Although the accommodation now totals 600 rooms, reservations already made show that these will all be needed for the coming traffic.

Motor traffic to the parks reached a larger volume for June than in the same month in any previous year. The Banff park is now accessible all the year round by motor, although tourist traffic cannot be said to begin until May. In April last, however, more than 1,700 cars went over the road between Calgary and Banff. In May the number of cars entering the park totalled 5,540 and in June 7,303. In the week-end from June 30 to July 2, in spite of the fact that there were heavy rains during Saturday, Sunday and Monday morning, 2,177 cars entered the park by the Kananaskis or eastern gateway, establishing the highest record for any week-end since the road opened. Attendance at the Government Hot Springs was also greater on this day than ever before recorded. The disappearance of snow from the high passes on the Banff-Windermere Highway permitted the opening of this road on May 17. During the period from that date to the end of June, 2,141 cars carrying 6,215 passengers, went over the highway. On the Kicking Horse Trail, which extends from Lake Louise to Golden, British Columbia, and connects Yoho national park with Rocky Mountains park, a similar activity was shown. Up to June 30, 1,034 cars traversed this highway, a high number, considering the time of the year and the location of the road. During the months of May and June a combined total of approximately 8,700 cars entered the three connected parks—Banff, Yoho and Kootenay.

In Jasper park passenger travel began early in June and reservations for

(Continued on page 4)

PEAT RECOMMENDED AS AUXILIARY FUEL*

Suitable for Use in Spring and Fall—Manufacturing Activities in Ontario and Quebec

Peat fuel is the only natural fuel, apart from wood, which occurs in economic quantities in the provinces of Ontario and Quebec. The Department of Mines up to the present time has surveyed, mapped and sampled over 250,000 acres of peat bogs, strategically located with respect to transportation and population in these two provinces. The total content of standard peat fuel which can be manufactured from the peat in this area is estimated to be considerably over 250,000,000 tons. The Dominion Fuel Board, in its interim report, recommended the use of peat where it can be produced and supplied economically, as a means of decreasing dependence on imported anthracite.

In order to demonstrate the feasibility of manufacturing peat fuel on an economic basis under conditions obtaining in Canada, the Dominion Government decided in 1927 to construct a peat manufacturing plant at Alfred, Ontario, according to the recommendations and plans of the Joint Peat Committee. The plant, which was completed in May, 1928, is practically automatic, and when in normal operation will have a capacity of 20,000 tons of standard peat fuel, during a season of 100 days, operating 22 hours per day. On account of the late spring and the excessive rainfall since that time, manufacturing operations were seriously retarded, but notwithstanding these drawbacks it is expected that about 10,000 tons of fuel will be available for sale at the termination of operations. Efforts will be made to market the fuel in an area within a 60-mile radius of the peat plant. It is expected that a large portion of the output will be consumed in the immediate locality, that is, within twenty miles of the plant, and that motor truck delivery can be employed for this business. The cities of Montreal and Ottawa, however, have been good markets for peat fuel and a portion of the production will be sold in these cities.

During the present summer it is expected that a peat manufacturing plant now in course of erection on a bog near St. Hyacinthe, Quebec, will be manufacturing peat fuel for sale in the vicinity of the plant and in Montreal. The product is the same as that manufactured at Alfred; the method employed, however, the hydro-peat process, is radically different. At Alfred the peat is removed from the bog by means of an automatic excavator, then macerated, spread on the ground, and cut into block for drying; but at St. Hyacinthe the peat will be excavated by means of powerful hydraulic jets, the hydraulicking serving the two purposes of excavating and macerating. The resultant mixture of peat and water is then distributed by pipe lines into shallow basins where, after it has been dried by the sun until it holds together, it is cut up into blocks. The capacity of this plant when in full operation will be in the vicinity of 15,000 tons annually.

Peat is an exceedingly valuable auxiliary fuel for heating in the early spring and late fall and is especially adapted for open fireplaces and kitchen ranges. It is not equal to anthracite in heating value and is, therefore, not suitable for burning in furnaces during severe weather, but it can be burned throughout the heating season in Quebec type heaters and heaters designed for burning wood. While peat is more bulky than coal or coke and long rail hauls should, therefore, be avoided, it is nevertheless estimated that about 20 per cent of the domestic fuel requirements of the provinces of Ontario and Quebec could be met by peat.

** Prepared under direction of Dr. Charles Camsell, Deputy Minister of Mines and Chairman, Dominion Fuel Board.*

NORTH AMERICAN GOLD PRODUCTION

1917 AND 1927

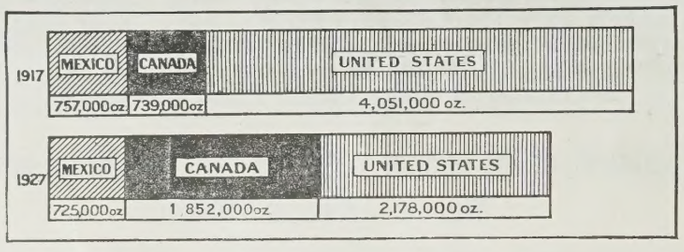
The last ten years have brought a radical shift in the sources of North American gold output.

Ten years ago the United States accounted for nearly three-quarters of the continent's total gold production. But since 1917 the gold output of the States has been almost cut in two, falling from over 4,000,000 ounces to little more than 2,000,000 ounces. The output for 1927 touched the lowest level in more than thirty years.

Mexican production during this decade has remained fairly constant, the figures for 1927 being slightly less than those for 1917.

With United States production declining, and that of Mexico virtually stationary, Canada has rapidly assumed a position of much greater relative importance. Compared with the figures for 1917 Canada's gold production last year showed an increase of nearly 150 per cent. The Dominion has outdistanced Mexico as a gold producing country and has been steadily closing in upon the United States. Amounting to less than one-fifth of the United States production in 1917, Canada's output last year fell only 15 per cent short of that of the States.

During this ten-year period the gold production of North America, as a whole, shows a substantial decline. Were it not for the manner in which the Canadian output has leaped forward, North America's relative importance among the gold producing continents would have been severely reduced.



GOVERNORS GENERAL SINCE CONFEDERATION

Are Commemorated in Place-names of Canada—Some Important and Picturesque Instances

Since Confederation Canada has had thirteen governors general, and the Geographic Board of Canada records that all have been commemorated in place-names. In this connection, however, it should be noted that, as Canadian governors general bear famous names and since this list refers only to governors since Confederation in 1867, many civil divisions and physical features which at first sight might appear to have been named after a governor general (for example Grey county, Ontario), were in reality named for an ancestor. To take in all cases of names given in honour of governors general would make a long list and the following are the more important or more picturesque.

The villages of Monck in Wellington county, and Monckland in Stormont county, both in Ontario, are named after Viscount Monck, while Lisgar township in Ontario, Lisgar Station in Quebec, and Lisgar electoral division in Manitoba are called after Baron Lisgar. Lord Dufferin's name is preserved in a parish and village in New Brunswick, in a county and township in Ontario, and in an electoral division in Manitoba. Lorne is a very popular name. There is a Lorne township in Ontario and villages of the name in New Brunswick, Quebec and Ontario. Other names with Lorne as the basis are: Lorne Creek in British Columbia, Lorne House in Quebec, Lorne Park in Ontario, Lorne Vale in Nova Scotia, and Lornevilles in Nova Scotia, New Brunswick and Ontario. The Marquis of Lorne also suggested the name of the province of Alberta which commemorates his wife, the Princess Louise Caroline Alberta. Lake Louise in the same province also bears the name of the princess, while Louise and Lorne are the names of lakes in Manitoba. Mount Lansdowne in the Yukon, Lansdowne lake in Keewatin, and villages in Ontario and Nova Scotia as well as an electoral division in Manitoba and a township in Ontario are among the features on which the name of the Marquis of Lansdowne has been bestowed. Stanley villages in Ontario and New Brunswick, recall Baron Stanley of Preston, as well as Stanley Bridge in Prince Edward Island and Stanley Section in Nova Scotia. A mountain in Alberta and a lake in Mackenzie District, Northwest Territories, are two of the principal features named after the Earl of Aberdeen. A mountain in British Columbia and a lake in northern Quebec bear Lord Minto's name as well as villages in Manitoba, Ontario and New Brunswick. Earl Grey is recalled by a mountain and pass in British Columbia, a village in Manitoba and by a river in Mackenzie District, Northwest Territories. There is also a Lady Grey lake in the same District. The city of Port Arthur, Ontario, takes its name from the Duke of Connaught, who was serving with the Rifle Brigade in Montreal when General (afterwards Sir Garnet) Wolseley on his expedition to Fort Garry in 1870 named it Prince Arthur's Landing. Devonshire, after the Duke of Devonshire, is the name of an Ontario village, while Evelyn pass in Jasper park, Alberta, is named after the Duchess of Devonshire. The names of Viscount Byng and Viscount Willingdon are borne by mountains in Alberta.

List of Governors General since Confederation

Viscount Monck, 1867-1868.
Baron Lisgar, 1868-1872.
Earl of Dufferin, 1872-1878.
Marquis of Lorne, 1878-1883.
Marquis of Lansdowne, 1883-1888.
Baron Stanley of Preston, 1888-1893.
Earl of Aberdeen, 1893-1898.
Earl of Minto, 1898-1904.
Earl Grey, 1904-1911.
Duke of Connaught, 1911-1916.
Duke of Devonshire, 1916-1921.
Baron Byng, 1921-1926.
Viscount Willingdon, 1926.

PRINCE ALBERT PARK DEDICATION ON AUG. 11

Prime Minister Will Preside at Official Opening of Saskatchewan's New Playground

Prince Albert national park, the latest addition to Canada's fine system of public reservations, will be formally dedicated to the people by the Rt. Hon. Mackenzie King, Prime Minister, on August 11 next. The opening ceremonies will be held at Waskesiu lake, one of the beautiful bodies of water found in the reserve, about thirty-five miles north of the southern gateway to the park. Other prominent guests will include representatives of the Dominion and Provincial governments, the Senate, the National Parks Service, western automobile and tourist associations, and members of municipal organizations from the principal cities of the Prairie Provinces.

Cars going to the park will line up at Prince Albert for the seventy-mile drive to the lake early in the morning of the eleventh and proceed thence to the park. Following the dedicatory ceremony an interesting program of aquatic sports and competitions will be carried out, most visitors remaining over night and returning to Prince Albert the next day.

CONTINUE EFFORTS TO CONTROL WOLF MENACE IN N.W.T.

(Continued from page 1)

Although the new bounty is considered a fair return for a wolf pelt, skins of exceptional quality often command higher than $30 at the trading posts. This is indicated by the fact that the average number of pelts sold to traders during the four fiscal years from 1924 to 1928 was about 300. No bounty is paid on these pelts as the trapper or hunter is required to hand in the pelt in order to receive the bounty.

The pelts thus received by Government officers are shipped direct from the posts in the Northwest Territories to the fur auctions where they are sorted, graded, and prepared for sale. Prime pelts bring top prices and each year since the new method was adopted the return from the auction sales has materially reduced the cost of the operation of the bounty. It might be said that the Department of the Interior has been making the wolf pay for his own destruction. The pelts taken during the fiscal year 1927-28 brought a gross return to the Department of $23,364.25, or an average price of about $24.

There is no doubt that wild life in the Northwest Territories is benefiting by the increased annual reduction in the number of wolves brought about by the new bounty system.

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HON. CHARLES STEWART.
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OTTAWA, AUGUST, 1928

MID-SEASON REVIEW OF POWER DEVELOPMENT IN CANADA

(Continued from page 1)

h.p. to supply energy for the operation of the Flinflon Mine.

In Manitoba, the Manitoba Power Company is adding two 28,000 h.p. units this year at its Great Falls station which will bring this station to its ultimate designed capacity of 168,000 h.p. On the same river the City of Winnipeg has commenced work preparatory to the development of the Slave Falls site, which is located some five miles below the city's existing station at Pointe du Bois.

In Ontario, the Ontario and Minnesota Power Company is completing its third plant on the Seine river at Calm lake where 13,200 h.p. will be produced and the energy transmitted to the pulp and paper mills at Fort Frances. The Spruce Falls Company has completed its initial development of 56,250 h.p. at Smoky Falls on the Mattagami river, this power going to the Company's pulp and paper mills at Kapuskasing. The International Nickel Company has initiated a 28,200 h.p. development at its Big Eddy storage dam on the Spanish river. The Ontario Hydro-Electric Commission has a new 54,000 h.p. development under construction at Alexander Landing on the Nipigon river as well as two smaller plants to serve its Nipissing and Georgian Bay systems respectively. The most important construction now being carried out by the Commission, however, is the new transmission line from Fitzroy Harbour on the Ottawa river to Toronto. This line will be more than 200 miles long and will operate at 220,000 volts, carrying 260,000 h.p. which the Commission has contracted to take from the Gatineau Power Company at the Quebec-Ontario boundary.

In Quebec there are a large number of developments in various stages of construction or about to be undertaken. On the Gatineau river the Gatineau Power Company, a subsidiary of the Canadian Hydro-Electric Corporation, expects to complete within the next two or three months the initial installation of six 34,000 h.p. units at Paugan Falls, which will supply power under the contract with the Ontario Hydro-Electric Power Commission referred to above. The same company also expects to add a 34,000 h.p. unit to its Chelsea plant and 24,000 h.p. to its Farmers Rapids plant, both of which are also on the Gatineau river. On the Saguenay river the Alcoa Power Company has let a contract for four 65,000 h.p. units for installation at Chute-a-Caron, the ultimate capacity of this site will be 800,000 h.p. On the same river the Duke-Price Power Company is installing this year one of the two units required to bring the Ile-Maligne plant to its ultimate capacity of 540,000 h.p. Amongst other enterprises may be mentioned 65,000 h.p. development of the Montreal Island Power Company on the Des Prairies river near Montreal for which a contract was recently let; the addition of two 10,000 h.p. units to the Canada Northern Power Company's plant on the Quinze river; the addition of a 40,000 h.p. unit to No. 2 station of the Shawinigan Water and Power Company at Shawinigan Falls; and the addition of a 25,000 h.p. unit to the Bryson station of the Ottawa River Power Company.

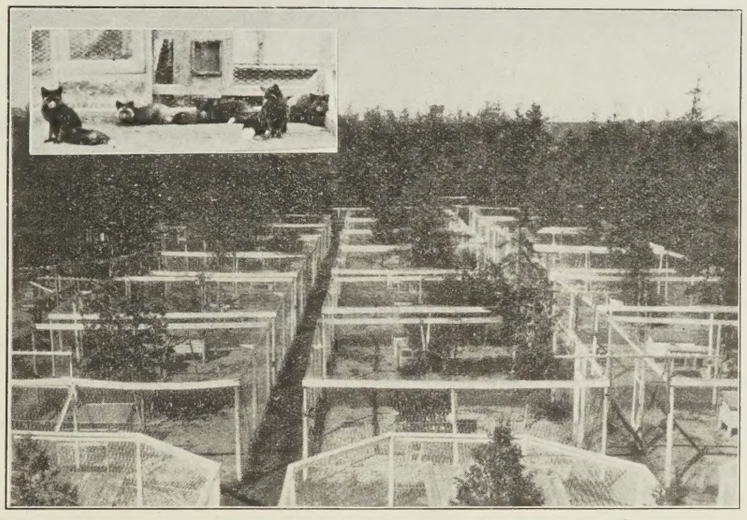
In New Brunswick, the Saint John River Power Company, also a subsidiary of the Canadian Hydro-Electric Corporation, will shortly complete the initial 60,000 h.p. of an 80,000 h.p. ultimate installation at Grand Falls on the St. John river. The Bathurst Company Limited has under active consideration the development of Rough Waters site near the mouth of the Nipisiguit river where an installation of some 8,000 to 10,000 h.p. may be made, principally to supply the company's paper mill at Bathurst.

In Nova Scotia, the Nova Scotia Power Commission is undertaking a development of some 20,000 h.p. on the Liverpool river for the supply of a pulp and paper mill to be erected in that district, whilst the Avon River Power Company has a 4,350 h.p. installation under construction on the Avon river at Avon River Falls, which should be completed this year. The Nova Scotia Power Commission is also considering bringing East River Sheet Harbour to its fullest possible capacity by means of a generating station at Marshall Falls and dams at all storage sites not yet developed. A further possible development at Lake Ainslie in Cape Breton is also being considered.

SILVER FOX RANCHING IN CANADA*

Advances Made in Research Work at Experimental Ranch —Progress of the Industry

During the last two years there has been an increase of over 50 per cent in the price of silver fox furs in spite of the fact that over sixty thousand pelts, from foxes raised in captivity, have been placed upon the market this season; and there is every reason to believe that silver fox furs are a staple commodity for which there will be a steady and increasing demand. The idea appears to have existed in the minds of the public and of some fox breeders as well that silver fox furs have been prized, and, therefore, commanded high prices, because of their rarity, and that silver fox ranching was a mere bubble that would burst when these pelts were produced in large quantities. Numerous fox breeders held the idea that the chief hope of making money was by the sale of live foxes and that it behooved them to reap the harvest as quickly as possible. This mistaken view has done great mischief to silver fox ranching as breeders are now beginning to realize. Another contention was that silver fox furs commanded high prices because they could not be imitated, and pessimists argued that when good imitations were produced cheaply the bottom would be knocked out of silver fox ranching. But one might as well argue that a greatly increased production of artificial flowers would put the florists out of business. In the early days of silver fox ranching the furs may have commanded, to some extent, high prices on account of their scarcity, but even at that, undoubtedly the greatest factors making for high prices were their rare and excellent qualities.



Silver Fox Ranching in Canada—View of a well laid out fox ranch in Prince Edward Island. Inset is a picture of a number of fine specimens of silver fox in a corner of their pen.

An analysis of the situation as a whole indicates that silver fox ranching is a well established industry, producing a commodity for which there will be a steady and increasing demand, and, while unfortunately there are some who are exploiting the industry and straining its possibilities, the more intelligent fox breeders are making determined efforts to build up silver fox ranching along the well recognized lines that have led to success in other industries. The National Fox Breeders Association of Canada, in co-operation with the Department of Agriculture, has already established a rigid and efficient system of registration of pedigreed silver foxes in order to improve the standard of the animals, and also a system of co-operative marketing of pelts to prevent undue sacrifices that previously were a cause of great loss of revenue to the industry.

Silver fox ranching presents great financial possibilities. The cost of feed and labour, and the capital expenditure for ranching equipment are much less than in other live stock industries. The average cost of the unprepared feed at the Experimental Fox Ranch of the Department of Agriculture at Summerside, Prince Edward Island, for an adult fox per year has been about $15, and for the feed required to raise a pup from birth to maturity about $10. A well equipped pen for one pair of foxes need not cost over $100. One hundred silver foxes can readily be ranched on ten acres of land and do not require the attention of more than two men. So that even if the price of silver fox furs dropped to near the level of wild-caught red fox pelts, which is extremely improbable, there would still be a good margin of profit from silver fox ranching carried on along sound economic lines.

At the present time fox ranching is somewhat handicapped through incompleteness of knowledge in connection with the care and management of silver foxes in captivity. As might be anticipated, breeding silver foxes in captivity presents certain difficulties that have not to be contended with in the case of other live stock. All the older classes of domesticated animals have been extensively studied along practical and scientific lines for many decades, but even with that knowledge, our domesticated breeding animals do best when turned out to forage for themselves on pastures, whereas, silver foxes in captivity are usually confined to quite small areas and their food is too often restricted solely to the selection made by the feeder, not the slightest opportunity being given the foxes to forage for themselves.

Much progress has been made in the study of the various requirements of these animals at the Experimental Fox Ranch. In general it may be said that this information points to the need for ranchers to carry their animals along as far as possible, under conditions similar to those under which the foxes would live if running in the wilds.

Silver fox ranching is an industry which Canada has given to the world but the Dominion's favourable conditions for the production of fur and the knowledge that she has already acquired in silver fox ranching have given her such a start that for several decades other countries will naturally look to her for breeding stock and ranching methods; more especially is this true regarding the province of Prince Edward Island, where the industry was created and nursed through its infancy.

** Prepared at the direction of Dr. J. H. Grisdale, Deputy Minister of Agriculture, by Mr. G. Ennis Smith, Superintendent, Experimental Fox Ranch, Summerside, Prince Edward Island.*

OIL PRODUCTION IN ALBERTA

The following comparative figures on petroleum production in Alberta during the month of May, 1928, and the corresponding period last year were compiled from statements submitted by operators to the Department of the Interior. There was a substantial increase in all grades.

	Naphtha crude (brl.)	Light crude (brl.)	Heavy crude (brl.)
May, 1928..	36,705	6,670	832
May, 1927..	26,291	2,142	380

WORK OF GEODETIC SURVEY OF CANADA

Triangulation and Astronomical Observation Fix Points For Later Surveys and Development

The need of all new countries is development, and development proceeds most rapidly and steadily where the farmer, the miner, and the millowner are safeguarded not only as to the title to property but also as to its exact boundaries. In this regard western Canada has been particularly fortunate because the Dominion Lands system of survey has been laid down with the greatest care and furnishes absolute security of title.

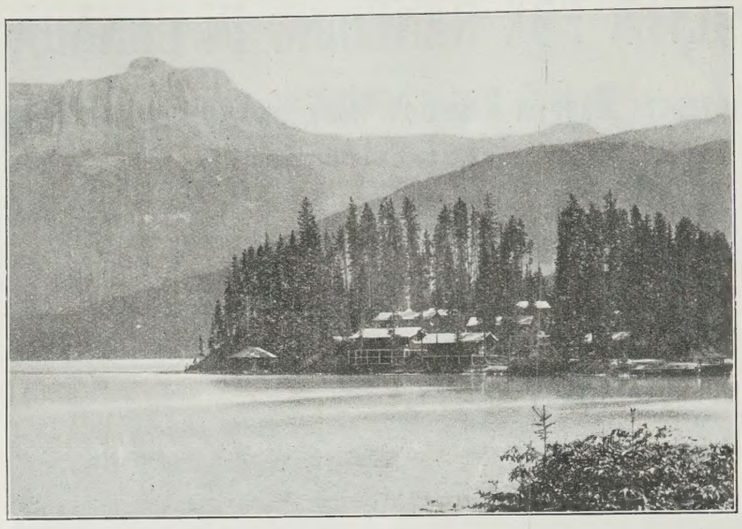
Geodetic and topographical surveys are not unconnected, but are complementary one to the other. The Geodetic survey by triangulation and astronomical observations fixes accurately the location of points on the earth's surface, and the other surveys tie in their work to these accurately determined points. Another function of the Geodetic Survey of Canada, Department of the Interior, is the taking of precise levels throughout Canada from Atlantic to Pacific. It can readily be seen that in the development of the country by the construction of dams and power houses, bridges, railways, canals, irrigation ditches, and public buildings, a knowledge of the elevation above sea level is a necessity.

The Geodetic Survey publishes the elevations of points, that have been marked and named, correct to one-tenth of an inch in the case of geographical positions and to one-eightieth of an inch in the case of bench marks.

This precise levelling demands the utmost care of the engineer and of every member of the survey party and at times calls for great physical effort and tenacity of purpose. As a rule precise level lines are run over railway tracks or travelled highways. If it becomes necessary to run a line through a forest the trees and brush have to be cut down so as to give an uninterrupted line of sight between stations for the entire distance. Again, the intended line to be surveyed may lead over ice-capped mountains, or through swamps or muskegs, with their myriads of voracious mosquitoes of a savage type unknown in inhabited regions; or the line may cross rivers and broken country. Whatever the characteristics of the locale may be, or whatever difficulties in progress lie ahead, these make no difference; the line has to be pushed through, with the result that often the same ground has to be measured over and over again until the exact figures have been arrived at.

All surveyors, whether geodetic or topographical, when in the field find in fog and smoke two of the worst enemies. The smell of a forest fire wafted to a survey party enmeshed in the bush gives rise to the fear that in addition to whatever harm the fire may cause by destroying timber, it will also result, if the smoke blows their way, in interfering with their work and possibly causing them to be trapped within a circle of fires.

It says much for the stamina and technique of the engineer that his figures which, as indicated above, must be correct to within a small fraction of an inch, are worked out very often under trying circumstances. In most cases he has no opportunity to collate his figures until the day's field work is done, and then with such shelter from the weather as is afforded by a tent, he continues at his computations long after the others have gone to sleep. Next morning, early, he is again on his way, determined either to find that missing fraction of an inch which his calculations have shown, or, if no errors have been disclosed, to push on with the next stage of his work.



Canada's National Parks—Looking across an arm of Emerald lake to the Emerald Lake chalets, Yoho national park, British Columbia. In the background rises the majestic form of mount Burgess.

EARLY TRAFFIC TO NATIONAL PARKS BREAKS RECORDS

(Continued from page 1)

the season indicate a larger volume of traffic than ever before. The new extensions to Jasper Park Lodge give increased accommodation as well as add to the pleasure and comfort of visitors. The Jasper golf course is also one of the great attractions and the outstanding character of the links induces many visitors to remain longer in the mountains than they had at first anticipated. Trail riding in Jasper park is increasingly popular and each year the number grows of those who establish intimate acquaintance in this way with the great and more remote regions of this playground. This season several of the outstanding trips are being organized so as to save the visitor both the time and expense of pack trains and many who have only a limited time to remain in the park will thus be able to see more of the interesting and remarkable regions which this park contains.

In Waterton Lakes park the new Prince of Wales hotel, opened last year by the Great Northern Railway Company, also reports a record number of bookings. This hotel is built in the style of an attractive Swiss chalet very much after the design of the well known hotel at Many Glaciers in the Glacier national park in the United States. Its site commands a glorious view up the whole length of Waterton lake into the United States territory with a background of sculptured and coloured ranges. The exceptionally good fishing in this park makes it one of the most popular with anglers and few visitors of this class go away disappointed. This year regular bus and motor boat services will be maintained between the United States park and the Canadian park. Thus these recreational areas form an interesting and unique example of how much adjoining national playgrounds may promote international good will.

POLICE ACTIVITIES IN CANADIAN ARCTIC

Annual Expedition to Eastern Posts—New Patrol Ship for Western Arctic

The maintenance of law and order in the vast regions known as the Northwest Territories of Canada is one of the important branches of the work of the Royal Canadian Mounted Police. The administration of this great area, extending from Baffin island in the east to the Mackenzie river delta in the west and north and south for over 2,000 miles from the 60th parallel of latitude to the North Pole, is carried on by the North West Territories and Yukon Branch of the Department of the Interior. Police posts are established along the Arctic coast and on the islands of the archipelago, and from these points patrols and investigations are undertaken each year by the officers stationed there. Thousands of miles of Arctic waste are covered and scores of Eskimo villages are visited during these patrols. Conditions among the natives are investigated and reported, relief is provided where necessary, and the law is enforced as required.

Each year relief personnel, supplies and provisions are carried north to these outposts of civilization. Two years is the usual tour of duty for a police constable at one of the northern posts, although quite frequently the Arctic forms an almost irresistible attraction for members of the Force and they return time and again.

The posts on the islands in the eastern Arctic are visited by the annual expedition sent out by the North West Territories and Yukon Branch. This year nine officers and other ranks, sailed with the expedition on the ss. *Beothic* on July 19. These men will relieve those who have completed their tour of duty at the following posts: Pond Inlet, Pangnirtung, and Lake Harbour, Baffin island; Dundas Harbour, Devon island; and Bache peninsula, Ellesmere island. The relief party is in charge of Inspector A. H. Joy and includes Corporals Timbury and McBeth, and Constables McLean, Taggart, Hamilton, Ashe, Moore, and Beatty. The members of the Force coming out will return on the *Beothic* in September.

Late in June the Royal Canadian Mounted Police's new auxiliary schooner *St. Roch* sailed from Vancouver to reprovision the posts in the western Arctic. The new vessel will sail by way of Bering strait passing around the northern coast of Alaska to Herschel, Yukon Territory, which it is expected will be reached about the end of July. The *St. Roch*, which was built at North Vancouver last winter, is powerfully constructed. Her hull has been specially reinforced to withstand the action of the ice and has a thickness of practically 22 inches. She is fully equipped and modern in every respect. There is accommodation for 13 officers and men and a powerful wireless set which will keep this floating detachment in touch with headquarters throughout the northern voyage and while on patrol along the Arctic coast.

A crew of ten men are taking the ship north. Captain W. H. Gillen, of Vancouver is in charge of the vessel with P. Kelly as chief engineer, as far as Herschel island. The following members of the Royal Canadian Mounted Police complete the crew: Constables T. G. Parsloe, M. J. Olson, Larsen, Tudor, Foster, Sealey, Parry and Lamothe. The vessel will be commanded and manned exclusively by members of the Royal Canadian Mounted Police; several of those mentioned are in possession of master's or mate's certificates.

ARCTIC PATROL SHIP MAKES GOOD PROGRESS

S.S. "Beothic" With Canadian Government Expedition Aboard Visiting Far Northern Posts

Canada's 1928 expedition to the posts in the Arctic archipelago sailed from North Sydney, Nova Scotia, at noon on July 19 aboard the ss. *Beothic*. The principal work of this year's patrol will be to visit the different posts in the Eastern Arctic, where changes in the police personnel and the landing of supplies and provisions will be effected. An exchange of courtesies with Danish officials at Godhavn and Etah, Greenland, is also planned.

The sailing date of the *Beothic* was originally set for July 18 but a delay in completing the loading of coal for the voyage and for the needs of the posts necessitated the vessel remaining overnight in North Sydney harbour. Mr. George P. Mackenzie, of the North West Territories and Yukon Branch of the Department of the Interior, is again the officer in charge of the expedition.

Daily wireless communication with the Louisburg, N.S. station will be attempted during the entire voyage. Last year Wireless Operator E. J. Mead was able to keep in touch with civilization throughout the trip and this summer it is hoped that his efforts will be attended with the same success.

The first part of the voyage was uneventful. There was some rough weather in the northern part of the gulf of St. Lawrence between Newfoundland and the Canadian Labrador, and after passing through the strait of Belle Isle the ship had to be slowed down on account of fog. This was followed by clear weather when the ship made good progress, Godhavn, Greenland, being reached on July 26.

Canada's Forest Area

The total forest area of Canada is 1,200,000 square miles but only 38 per cent of this area carries any timber of merchantable size which is presently accessible or likely to become accessible for many years.

NATURAL RESOURCES CANADA

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THEIR EXCELLENCIES VISIT PEACE RIVER COUNTRY

Canada's Governor General and Lady Willingdon Travel Beyond Rail-Head by Motor and River Boat

Breaking new ground in respect to vice-regal tours, Their Excellencies the Governor General and Lady Willingdon, during the past summer, went beyond the end of the most recently constructed railway line and by motor car and river steamer penetrated the Peace River country to Hudson's Hope in the foot-hills of the Rocky mountains. The town of Peace River where the motor trip began is by railway 312 miles northwest of Edmonton, and from Peace River to Hudson's Hope, as the crow flies, is approximately 180 miles; but Their Excellencies on their outward journey covered about 500 miles by motor, inspecting the country and visiting settlements on both sides of the line of route.

The outward journey was made by motor car and steamer and the return entirely by steamer down the Peace river, and the vice-regal party thus saw in a few days a wide belt of country. All along the route Lord and Lady Willingdon were accorded an enthusiastic reception, with addresses, luncheons, and other functions. No accident occurred to mar the tour; the weather throughout was fine, and the long hours of sunlight enabled a comprehensive program of travel and sight-seeing to be crowded into each day. The prospects of a bountiful harvest added to the general feeling of buoyancy and optimism throughout the district.

The special train from Edmonton carried the party to Peace River town, where there was a civic reception. At the conclusion of this His Excellency motored to Falher and Donnelly and at the latter place visited the Roman Catholic school, returning to Peace River in the evening. While the Governor General was on this trip Her Excellency was entertained at Peace River by the ladies of the district. The following morning Their Excellencies left their train and motored all day both to the north and south of the railway line, while the train proceeded to Grande Prairie. During the morning motor run the Governor General's party visited Grimshaw, Berwyn, Whitelaw, Waterhole, and Dunvegan. They lunched at the famous old post of the Hudson's Bay Company at Dunvegan and, crossing the Peace river by ferry, motored through Roycroft, Spirit River, Sexsmith, and Claremont, to Grande Prairie, which town was reached at 8 p.m. After the reception here was over Their Excellencies went by train to Wembley where the night was spent. This is the last station so far completed on the line but the rail-head has been pushed on to Hythe about thirty miles farther. The next morning the vice-regal party left by motor for Pouce Coupé, passing alongside Lake Saskatoon and through Cut Bank and Niobe, doubling back to Beaverlodge for lunch.

Their Excellencies Visit the Peace River Country—View showing the Hudson's Bay Company's river steamer, "D. A. Thomas," on which the vice-regal party travelled down the Peace river from Hudson's Hope to Peace River town on the return journey.

In the afternoon Their Excellencies visited the Dominion Experimental Farm at Beaverlodge and continued their journey to Pouce Coupé, stopping at Hythe and Brainard *en route*. At Pouce Coupé the night was spent in a hotel which had just been completed. On the following morning Their Excellencies visited Dawson and Rolla, and at the latter place the Governor General laid the corner-stone of a United Church. At the conclusion of this ceremony the journey was resumed to Fort St. John and Taylor's Flats. At the latter point the Hudson's Bay Company's steamer *D. A. Thomas* was in waiting and in this vessel the vice-regal party were conveyed up river to the head of navigation at Hudson's Hope. The country about Hudson's Hope was explored, particularly the part lying upstream, where the Peace river races down from the foot-hills through a deep canyon. The return trip from Hudson's Hope to Peace River town, where the private train was waiting, was made on the steamer *D. A. Thomas*.

(Continued on page 3)

PRIME MINISTER OPENS CANADA'S NEWEST NATIONAL PARK

Dedicates Prince Albert Park to Nation's Good—Thousands Witness Ceremony in Saskatchewan Playground

"In opening to-day Prince Albert national park, we dedicate it to the glory of the Creator, whose bounty it mirrors in forest, lake, and stream, and to the highest good of the Canadian people for all time to come." In this noble peroration, Right Honourable W. L. Mackenzie King, Prime Minister of Canada, officially opened the Dominion's newest playground, a primitive paradise of some 1,400 square miles of forest, lake, and river in the historic reaches of northern Saskatchewan.

Accompanied by Honourable Charles Stewart, Minister of the Interior, one of the functions of whose department is the administration of national parks, and standing on the shore of lake Waskesiu, where nearly three thousand people had gathered in the summer sunshine, the Prime Minister dedicated this wonderful district to the people of Canada. Situated north of the city of Prince Albert and within two days motor travel of any part of Saskatchewan, the park is located in the heart of a virgin forest region traversed by a water-highway that branches into two great canoe routes, so that it is possible to travel hundreds of miles by canoe without having to journey over the same lake or river twice. These two routes are among the most historic in the Canadian Middle West. They were used for over a century in pioneer days by the fur traders and voyageurs; the one, to the northeast, leading to Hudson bay, and the other, to the northwest, to lake Athabaska and the Mackenzie valley. Bear, moose, deer and other game animals roam through the forests of the park; bird life abounds; pelicans and other large birds nest around the lakes, of which there are hundreds with white sand beaches gleaming through dark fringes of spruce and fir; and every stretch of water teems with fish.

"In the building of Canadian national life" said the Prime Minister, "and the moulding of our national character it is of the utmost importance that we should cultivate an appreciation of all that is beautiful in our physical environment. In a young country so amply endowed with material resources there is always a danger that we may turn to the gods of the market place, and sacrifice the beautiful on the altar of utility. To be aware of the danger is a long step towards the application of the remedy. It is indeed cause for deep satisfaction that Canada in her youth has learned the wisdom of conservation. The existence of ten national reservations, covering an extent of more than 11,000 square miles is the best possible evidence that the foundations of our country are rooted in the things that endure beyond the life of brick and mortar. A time may come, with the westward advance of population and industry, when this national possession may be threatened with destruction. Should that time ever come, however, I believe that these national parks will have become recognized as such a precious element in our common inheritance that there will be a body of public opinion in this country strong enough to withstand every assault on these citadels of nature We build to-day not merely for the present and for to-morrow, but, I trust, for all time to come."

The Prime Minister in the course of his address reminded his hearers of the great historical associations of the district. "In view of its unique historical associations" he said "it should also serve to remind us of the explorers and pioneers of Western Canada and of the romantic chapters in our history, which have their origin in the fur trade and the pioneer life of the prairies."

For Pictures, See Page 4

AIDS TO NAVIGATION IN HUDSON STRAIT

Most Modern Radio Devices Being Installed —Station at Churchill

During the summer of 1927, three radio stations were established in Hudson strait by the Department of Marine and Fisheries for the purpose of handling the reports on observations—of ice, weather, and other conditions—made by the expedition sent there for that purpose. The stations were located at Nottingham island, Port Burwell and Wakeham Bay, these points being considered at the time the most advantageous as bases for observing the drift of ice during the winter months, the last-named being the control station which maintained uninterrupted communication with Ottawa. Valuable information was obtained concerning the movements of ice in the strait during the past winter and spring, not only from shore observations, but with the aid of aeroplanes which made numerous flights even during the extreme cold weather. These planes, having now served their purpose, are to be brought out this summer, and the stations at Wakeham Bay and Port Burwell are to be closed. The preliminary work of investigating conditions of navigation through the strait having been concluded, the establishment of further stations on a permanent basis as aids to navigation will be undertaken during the coming season.

While the work of completing the railway to Canada's new ocean terminal at Churchill, Hudson bay, is proceeding apace, due provision is being made for safe navigation by the large volume of shipping which, as a result, will ply through Hudson strait and bay. In pursuing its policy of making Canadian waters as safe for shipping as is humanly possible, the Department of Marine and Fisheries has now under construction a number of strategically placed radio direction-finding stations which will enable radio-equipped vessels to navigate the 550-mile stretch of the strait in all kinds of weather and thence onward across Hudson bay to Churchill. The work of erecting these stations is in the hands of the Radio Branch of the Department of Marine and Fisheries, and that Service will carry on their subsequent operation.

Radio direction-finding is the latest device contributing towards the safety of ships at sea, and so far as concerns modern vessels, largely obviates the necessity for lighthouses and fog alarms. When later the traffic through Hudson strait increases it may be necessary to add lights and sound signals at certain points to aid the passage of ships not equipped with radio, but at the present time as practically all vessels using the strait are equipped with radio, direction-finders alone will give adequate freedom and safety to navigation. With two suitably located stations at the eastern, or Atlantic end of the strait, two at the western end and an intermediate station on the way, a vessel will have a clear run through the strait in fog or bright weather, while the station at Churchill will be so situated as to provide for the whole expanse of Hudson bay.

Fog is the bugbear of the mariner, and Hudson strait is no more exempt than North Atlantic waters. However, with the aid of direction-finding stations, the ships can continue an uninterrupted course so that fog is robbed of most of its terrors. The stations now being constructed will ensure a safe passage, however thick the weather may be, and their locations will be such that ships will always be able to obtain simultaneous bearings from two stations.

The use of radio direction-finding equipment is not confined to stations on shore. Many ships are themselves now fitted with direction-finders, by means of which they are enabled to take bearings to radio stations located at fixed points on shore whose exact positions are known to mariners. This has led to the development of a special type of radio transmitting station which has been aptly named the "radio beacon." Several stations of this type have been established along the Canadian coasts, and are giving very satisfactory service. Each beacon has been allotted a characteristic signal which it automatically transmits when in operation, by means of which it is identified and distinguished from the others.

As all of the above-mentioned coast direction-finding stations will, of course, be equipped with transmitters for communication with shipping, they will also be available to act as radio beacons when required. That is to say, ships equipped with direction-finders may request any of the stations to transmit signals to them for the purpose of taking their own bearings, and in this way a check may be had on the bearings given by the shore stations. The stations now being erected will, in addition to performing the direction-finding service, handle radio-telegraph traffic with shipping.

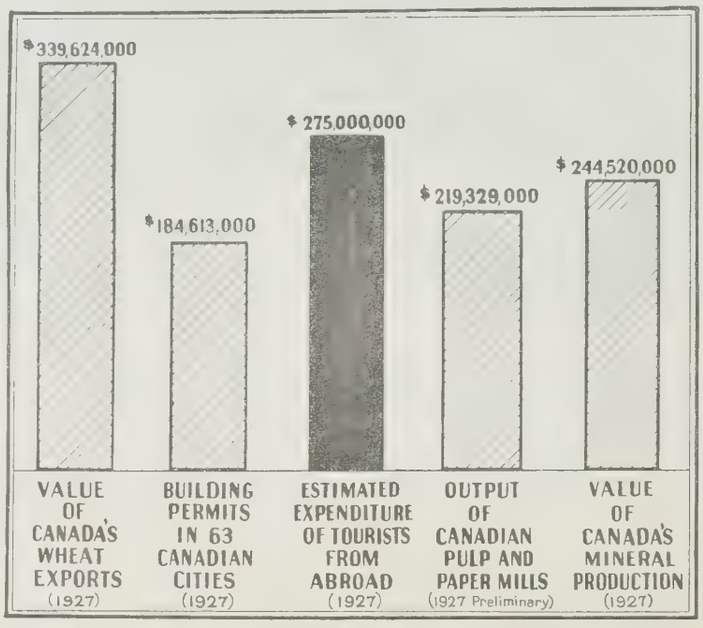
The station at the eastern end of the strait will communicate with the station at Belle isle, which is the eastern terminus of the Gulf of St. Lawrence chain. The station at the west end of the strait will communicate with Churchill, which connects with the landline system via the station at Mile 356, Hudson Bay Railway, thus forming a complete loop of radio communication around Hudson bay and strait. In addition, direct communication is maintained between VFL (the Marine Department's short wave station at Ottawa) and the station at Wakeham Bay, in the middle of the strait, on short wave.

A NEW GIANT OF CANADIAN BUSINESS

The Highways Branch of the Department of Railways and Canals has estimated that somewhat over $275,000,000 ($276,288,140) was spent in Canada in 1927 by tourists from abroad. It takes some effort to appreciate the real value of this tourist business—a phase of Canadian trade which was almost ignored a few years ago.

Wheat is easily the largest single item of the Dominion's export trade. The pulp and paper industry is, in point of value of output, the country's greatest manufacturing enterprise. Mining is a huge and rapidly growing source of wealth. And the building industry is another factor that powerfully influences the activity of Canadian business.

Standing up alongside such items as these, the tourist trade can to-day claim a clear title to a place among Canada's chief business interests. And it is a form of development to which Canada can look with every assurance of further great and long-continued growth, for as regards natural attractions for outdoor recreation Nature has placed the Dominion permanently among the 'most favoured nations'.



BIG INCREASE IN ALBERTA'S PETROLEUM PRODUCTION

Petroleum production in the province of Alberta was higher during the month of June this year than in the corresponding period in 1927 according to the following figures compiled from statements submitted by operators to the Department of the Interior:—

	Naphtha crude (brl.)	Light crude (brl.)	Heavy crude (brl.)
June, 1928.	36,263	10,284	841
June, 1927.	23,065	2,575	410

ISSUE NEW MAP SHEET

The Topographical Survey, Department of the Interior, has just issued the Regina sheet of the International Map of the World on the scale of one to a million. This is the first map of this series to be issued in Canada. It includes the area from latitude 48° to 52° and longitude 102° to 108°, the southern quarter thus being in the United States. Information for the mapping of the latter quarter was supplied by United States officials.

REINDEER SURVEY NEARS COMPLETION

Investigators of Department of the Interior Are North of Great Bear Lake

Investigations by officers of the Department of the Interior to determine the reindeer grazing possibilities of the great northern plains of Canada reaching to the Arctic ocean are nearing completion. The study of these areas was undertaken in 1926 for the North West Territories and Yukon Branch by Messrs. A. E. and R. T. Porsild, botanists and biologists, in order to decide the practicability of establishing herds of reindeer as a source of food and clothing for the Eskimos and Indians of the far north. A recent report from the investigators stated that they were working in the area north of Great Bear lake. This part of the survey will be completed this autumn after which the party will return to Ottawa to present a complete report of their two years' work to the Department.

The problem of securing new sources of food and clothing for Canada's native population in the far north has engaged the attention of the Dominion Government for some time. Our wild life, driven back into the great hinterland by the advance of settlement and development from the south, has had to face new menaces from the introduction of modern firearms and hunting methods among the natives. Consequently this source of food supply is gradually diminishing and the need of providing a supplementary source of supply is becoming more pressing. The successful introduction of reindeer among northern aborigines in other parts of the continent suggested the possibility of the reindeer being a solution of the problem in Canada. Early reports from the Messrs. Porsild stated that an immense reindeer grazing area covering about 15,000 square miles lay to the east of the Mackenzie River delta and inland from the Arctic ocean, which it was estimated was sufficient to provide grazing for 250,000 reindeer.

Additional areas are being surveyed this summer. This work entails travel by canoe and on foot through the regions bordering on Great Bear lake. The investigators arrived at Dease bay at the northern end of the lake in the middle of April and there established a base. R. T. Porsild returned to the western extremity of the lake where he carried on investigations in the region around Fort Franklin and Norman. A. E. Porsild made a long trip to the northeast via the Dismal lakes and Coppermine river to Coronation gulf, returning westward to the headwaters of the Horton river and then south to Great Bear lake. Having concluded their individual investigations the Porsild brothers met again at the base and with the opening of navigation began their voyage around the lake by boat. They will supplement this by trips inland on foot from various points.

A great number of botanical specimens and a vast amount of information have been gathered during the two years' study of the grazing lands of the North. This material will undoubtedly be of great value in the consideration of the question of establishing reindeer herds in northern Canada.

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THEIR EXCELLENCIES VISIT PEACE RIVER COUNTRY

(Continued from page 1)

Lord and Lady Willingdon were given evidence on every hand of the resources of the country. The automobiles conveying the party were driven in wide circles throughout the fertile valleys, and, then, from time to time were stopped on the brow of some hill that an extensive view of the country might be obtained. Specimens of grains, roots, and minerals were brought forth for inspection and His Excellency conversed with many pioneers upon their experiences. At Hudson's Hope the vast undeveloped resources of water-power in Peace River canyon in proximity to many economic minerals, including anthracite coal, was seen to give promise of immense development. His Excellency was impressed with the large amount of land already under cultivation and was struck by the resemblance of the Peace River country to the "down" country of England, particularly the South Downs, a rolling country in which the rich valley lands are divided by hills adapted to the grazing of cattle and sheep. Lord Willingdon discussed with a number of prominent residents the possibilities of increasing the number of cattle in the district and also the introduction of sheep. One of the most fascinating features of the trip was the opportunity to see the actual beginnings of towns, and the moving of entire villages from the original location to sites along the recently constructed railway line.

The Peace River community is composed of Canadian settlers (both English-speaking and French-speaking), settlers from the British Isles, the United States, and from Scandinavia but the whole atmosphere is British. This fact was the one which impressed His Excellency most strongly, and along with it was the evidence of the need for improved transportation for the people already there and for moving the freight sent out and brought in by so large and energetic a population.

Canada's Winter Sports

Canada has always been noted for its winter sports. From the earliest times skating, tobogganing, and snowshoeing have had their devotees, and, with the increase in the urban population and the greater need for outdoor exercise to offset the strain of the close application to indoor pursuits, these forms of sport have been supplemented by ski-ing, curling, ice-boating and hockey.

MUSKRAT FARMING IN WESTERN CANADA

Great Interest Being Shown in Industry—Many Acres of Marshland Leased

A constantly growing demand for furs and the encroachment of civilization on areas which support wild life have been steadily depleting the fur resources of the North American continent. Notwithstanding the fact that in the vast wilderness areas, behind the settled parts of Canada, a great part of the wild life of the continent has taken refuge, settlement and development are year by year penetrating these areas and further threatening our fur resources. Pelt production figures reflect the changing conditions. The numbers of pelts taken continue to increase, but the figures are low for the more valuable wild-caught skins. The high total for all pelts is largely due to the fact that fur-bearers, previously ignored by trappers, are now being taken in large numbers. Rising prices for these and all other pelts have followed the increasing demands for furs but, in the face of this, consumption continues to increase.

The lowly muskrat has experienced a most remarkable rise to prominence among the fur bearers. At one time the muskrat was looked upon as a pest and was disregarded by the trapper unless a great number could be taken with little trouble. To-day this little slough dweller is one of the chief factors in maintaining a high total value for our annual fur production and in commercial importance heads the list of fur-bearers taken in Canada. This growth in popularity is due to two valuable properties, namely, the pelt's long-wearing qualities and its suitability for dyeing.

Expanding settlement has brought with it the removal of forest growth, the draining or drying out of swamps and marshes, and in other ways the destruction of the natural haunts of many of our wild animals. This movement is gradually curtailing the trapping areas of the Dominion and to offset this fur farming has been developed with considerable success. In the early days of the fur trade it was the practice in Canada for trappers to keep foxes or other wild fur bearers, caught in warm weather, alive until the fur was prime, and from this custom has arisen the modern industry of fur farming. The obtaining and disposal of furs has been a part-time occupation and a source of additional revenue for many Canadian farmers, and the development of the fur farming industry and particularly muskrat raising has increased the opportunities of farmers in this regard. On many farms occur small stretches of marshy or low-lying land which may with small expense be turned into breeding places for muskrats. During the summer season the animals provide for themselves with little or no assistance. In the winter lower grades of clover, alfalfa, grains, grasses, vegetables, fruits, and other farm products which might otherwise be wasted may be used with profit as feed for the rodents. The preservation of marshes also provides refuges for wild water-fowl.

In recent years the development of muskrat farms has progressed rapidly, particularly in Western Canada. Marshlands hitherto considered almost worthless have suddenly increased in value. Large areas are being taken up for muskrat farming and so rapidly has the new branch of the fur farming industry extended in recent years that according to the Dominion Bureau of Statistics there were 107 muskrat farms in Canada in 1926 and of these 66 were located in Western Canada. By 1927 the requests for swamp lands in the Prairie Provinces on which to carry on muskrat farming had become very numerous. As lands in the provinces of Manitoba, Saskatchewan, and Alberta are administered by the Dominion Government the question of making available marshlands not required for any other purpose was taken up with the Department of the Interior. Realizing the close connection between the muskrat farming industry and the control of wild life which is a provincial responsibility, the Department entered into an arrangement with the provincial authorities whereby the lands applied for, after due investigation, are leased to the provinces concerned for the specified purpose and the provincial authorities in turn lease them to the applicants.

Generally throughout Canada muskrat farming is proving popular and profitable. However it is in the Prairie Provinces and in British Columbia that the most rapid development is taking place.

ESTABLISH MEDICAL OFFICERS IN ARCTIC

Department of the Interior Takes Important Step in Caring for Northern Natives

Realizing that the future development of the Canadian north depends to a large extent on a healthy and contented native population, the Department of the Interior has ever maintained efforts to this end. An important step taken since the Department assumed the administration of Eskimo affairs last year was the decision to station medical officers on the Arctic coast and islands. Dr. L. D. Livingstone, whose work among the Eskimos of Baffin and other Arctic islands covers a number of years, again returned north with the ss. *Beothic* this summer and after a visit to the various posts with the ship he disembarked at Pangnirtung to resume his work among the natives of Baffin island.

Another post at which it was decided to place a medical officer before winter set in was Aklavik in the delta of the Mackenzie river. In response to the official announcement of this vacancy, applications were received from a number of competent physicians, and Dr. W. M. Wilkinson, of Elsas in northern Ontario was selected. His sudden death from heart disease at Edmonton *en route* to his new post necessitated the selection of another officer. Dr. J. A. Urquhart, of Mountain Park, Alberta, who is a graduate of McGill, a veteran of the great war and has had considerable experience with northern and pioneer conditions, was appointed. He left Edmonton on August 21 in order to catch the last boat this season from Fort Smith, N.W.T., down the Mackenzie to Aklavik. Dr. Urquhart, in addition to his work among the natives, will also give medical assistance to the representatives of other federal departments in the north, namely, the Royal Canadian Mounted Police, the Department of Indian Affairs, and the Department of National Defence (Royal Canadian Corps of Signals).

THE LURE OF CANADA'S MINERALIZED REGIONS*

Unparalleled Activity in Areas Underlain by Precambrian Shield—Vast Sums Being Expended

The year 1928 will undoubtedly be a record one in the history of Canadian mining. The search for mineral deposits has been unequalled both for its intensiveness and for its breadth of activity. Never in any one year has so much money been spent in exploration as will have been spent this year. The operations are Dominion-wide but by far the most important are those that are directed to areas underlain by the Precambrian rocks of the northern parts of the provinces of Quebec, Ontario, Manitoba, and Saskatchewan, and of the Northwest Territories.

The most spectacular explorations are those that are headed into the more remote parts of the country east and west of Hudson bay. When it was learned last winter that transportation to Flinflon was to be provided, that that large ore-body was finally to be exploited, and that other large ore-bodies in northern Manitoba had been discovered, the Department of Mines at Ottawa was flooded with requests for information regarding that part of the country. Then interest broadened and the possibilities of more remote areas were considered. It was felt that the completion of the Hudson Bay railway to Churchill and the increase of boat transportation on the bay would render accessible a great stretch of country that had hitherto been regarded as Canada's hinterland. Then came the desire to be on the ground early and secure the best. The result is that a great many prospecting parties have left for these northerly areas. The exploratory work is entrusted to hardy men of experience and knowledge. Some prospectors have gone to Hudson bay by way of northern Ontario and northern Manitoba, others have left by boat from points on the Atlantic coast. One company alone has sent by boat ten parties of two men each and the necessary supplies. These will be assisted and directed by men sent in by aeroplane.

In the more readily accessible areas and in areas where transportation facilities are of the best, search for more mineral deposits is being prosecuted with feverish intensity. This takes the form of surface prospecting and of underground testing by diamond drilling, shaft sinking, and drifting. All this exploratory work has been given a powerful impetus by the discoveries centering on the northern part of the Manitoba-Saskatchewan boundary, the Rouyn area of western Quebec, and the Sudbury, Patricia, and other areas of Ontario, and it is expected that by the close of the year a very important addition will be made to the known and developed mineral reserves of the country.

** Prepared at the direction of Dr. Charles Camsell, Deputy Minister of Mines, by Mr. Wyatt Malcolm, Geological Survey, Canada.*

The Destruction of Wolves

As a result of the efforts of the North West Territories and Yukon Branch of the Department of the Interior, Canada, 1,292 wolves were destroyed in the Northwest Territories during the last recorded fiscal year by natives and white men.

Opening of Prince Albert National Park—Views taken on this historic occasion. (Left) Principals in the dedicatory ceremonies. Those on the platform from left to right are, Hon. T. C. Davis, Attorney General of Saskatchewan; Mr. H. J. Fraser, Chairman of the Citizens Committee; Hon. Charles Stewart Minister of the Interior; Rt. Hon. W. L. Mackenzie King. After having presented Mr. Verner Johnson (extreme right) with the Royal Humane Society's certificate, the Prime Minister is seen fastening the silver studded collar on "Prince," the famous lead dog. Mr. Johnson was honored for saving the life of a young woman who was carried by dog team 120 miles over forest trails during a blizzard to medical aid. (Right) Scene on the beach of Waskesiu lake during the opening ceremonies.

WIDESPREAD INTEREST IN METEOR SHOWERS

Recent Passage Through Perseid Swarm Received World-wide Publicity —Cause of Phenomenon

Since the earliest times occurrences of celestial phenomena have excited awe and wonder but the advances of modern science have dissipated the superstition with which the advent of comets and other travellers through the heavens was regarded. Eclipses, meteor showers, and the like are now no longer looked upon as signs of impending calamity and the growth of popular interest in these occurrences is evidenced by the world-wide publicity given to the recent passage of the earth through the Perseid meteor swarm, and in the large number of inquiries received by the Dominion Observatory, Ottawa.

Everyone has seen star-like objects shoot across the sky on a clear night, often leaving behind them for a moment phosphorescent streaks or trains. These are popularly known as "shooting stars." Many have also witnessed the passing of some larger celestial body, or a particularly brilliant meteor shower, a sight which is not soon forgotten. In reality "shooting stars" are small meteors, with which the heavens are thronged. It has been estimated that no fewer than 400 million of these solid particles rain down on the earth and are swept out of existence every day. Often a few of the larger meteors reach the earth but records of extensive damage done by them are rare. Investigations are at present being carried on to verify reports of the fall to the earth of two giant meteorites. In northern Arizona mining operations are under way to explore and determine the actual content of an immense meteor, which is estimated to weigh about 10,000,000 tons. A remarkable meteorite which is recorded as having fallen in the province of Yenissei, Siberia, did a vast amount of damage. The depression caused by this celestial visitor is several miles in diameter with evidences of the breaking up of the meteorite just before it struck the earth.

However by far the greatest number of the meteors which throng the heavens are of such small size that their contact with the earth's atmosphere, which travels at the enormous speed of 19 miles per second, causes their annihilation. Even stationary objects would become almost instantly incandescent through contact with the earth's protective belt so that when a rapidly moving meteor attempts to penetrate our atmospheric shield it is even shorter lived.

Meteor swarms, which are usually the result of the disintegration of some comet, generally travel in a fixed orbit. The size of this orbit, assuming that it is crossed by that of the earth, determines how often so-called "meteor showers" occur. There are three meteor swarms through which the earth passes each year, namely, the Andromedes, which are encountered in April; the Perseids, through which the earth travels in August; and the Leonids, met with in November. The Andromedes or Bielids came into being with the breaking up of Biela's comet; the Perseids, which are believed to have originated in Tuttle's comet, gained their name from their radiant or focal point, the constellation Perseus; the Leonids have as their radiant the constellation Leo and their orbit is closely related to that of Temple's comet.

It is not only in recent years that public interest has been shown in the movement of celestial bodies. The early progress of meteoric astronomy is intimately connected with the appearance of the great Leonid showers. The brilliant shower of 1833 aroused immense interest and the impress upon the popular mind has never been obliterated nor has the interest in meteors died out.

PROGRESS OF CANADA'S ARCTIC EXPEDITION

SS. "Beothic" Well Advanced on Southern Leg of Voyage—Successful Carrying Out of Patrol

The annual patrol through the eastern waters of the Canadian Arctic archipelago and visits to the posts established on Baffin, Devon, and Ellesmere islands is nearing completion and the return of the ss. *Beothic* to the port of North Sydney, Nova Scotia, is expected early in September. Wireless advices have kept the public constantly informed as to the progress of the ship and the successful carrying out of the various duties of the expedition.

The 1928 expedition sent out by the North West Territories and Yukon Branch of the Department of the Interior sailed from North Sydney on July 19, reached Godhavn, Greenland on July 26, and Pond Inlet, Baffin island, July 30. Supplies and relief personnel were landed and Inspector C. E. Wilcox, of the Royal Canadian Mounted Police boarded the ship and accompanied the expedition on the round of the posts.

After reprovisioning the post at Dundas Harbour the expedition headed northward for the dash to Bache Peninsula, Ellesmere island, the farthest north police post, customs house, and post office in the world. Owing to the tremendous fields of ice which are driven about Kane basin and into Buchanan bay this part of the patrol is always an anxious one for the expedition. This year ice conditions were not favourable and after four days battling with the floes in Buchanan bay the supplies for this post had to be landed at Fram Havn, across Buchanan bay from the detachment. The Royal Canadian Mounted Police officers stationed at Bache Peninsula had come across to meet the ship at Rice strait and they took charge of the supplies and will move them to the post.

The ship was turned southward and on August 8 reached Craig Harbour. Continuing its voyage, the *Beothic* touched at cape Sparbo on the north coast of Devon island where moving pictures were taken of herds of musk-ox found there. The ship made a return call at Dundas Harbour, Devon island, on August 13 and then sailed up Lancaster sound to Beechey island to establish a cache for the use of Inspector A. H. Joy, of the Royal Canadian Mounted Police during his patrols through this region next spring. Returning eastward, the expedition reached Pond Inlet, Baffin island, on August 15. Inspector Wilcox remained on board as he is returning to Ottawa.

From Pond Inlet the *Boethic* made a rapid run down the coast of Baffin island, calling at Pangnirtung and Lake Harbour to land supplies, and sailing from the latter port on August 26 for home.

FORT BEAUSEJOUR IS NOW A NATIONAL PARK

Famous Historic Site in Eastern Canada Included in System Under Department of the Interior

Another national area in Eastern Canada, Fort Beausejour Historic Park, in southeastern New Brunswick close to the Nova Scotia boundary, was formally opened last month in the presence of representatives of the Dominion and Provincial parliaments and prominent citizens of the neighbouring communities.

The proceedings in reality embodied a triple ceremony, for the dedication of the park to the people of Canada was accompanied by the unveiling of a tablet to the memory of the Yorkshire emigrants who between 1772 and 1776 came to the area now comprised in the adjoining counties of Westmoreland, New Brunswick, and Cumberland, Nova Scotia, and a tablet to La Valliere, Seigneur of Chignecto, 1678-84. The site covers an area of about fifty acres and commands fine views of Chignecto bay and the bay of Fundy. The chief interest in the park, however, will no doubt centre around the famous old fort built there about 1751 by the French for the protection of the early settlements in Acadia. In 1755 the fort was captured by a British force under General Monckton and the name was changed to Fort Cumberland.

During the years following 1770 Fort Cumberland lent its protection to settlers in the district. When the war of 1812-14 broke out, the fortress was repaired and strengthened, but was not attacked. After the withdrawal of the garrison, the place fell greatly into ruin and most of the buildings disappeared. The pentagonal wall of the fort, however, has withstood the ravages of time remarkably well and is an object of much interest to historians and tourists. Two years ago, on the recommendation of the Historic Sites and Monuments Board of Canada, the site was taken over by the National Parks Branch, Department of the Interior, and since then a number of improvements have been made. A pavilion for public use has been erected, roads have been built, and the lines of trenches thrown up by General Monckton during the British attack, located and marked.

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CANADA'S 1928 ARCTIC PATROL

Department of the Interior's Expedition Returns—All Posts Re-provisioned—Eskimo Conditions Good

The future of the Eskimo race in Canada's Eastern Arctic islands will to a large extent depend upon the continued healthful vigour of those Eskimos on Baffin island in the opinion of members of the Dominion's 1928 expedition to the posts in the northern archipelago which returned on board the ss. *Beothic* to North Sydney, Nova Scotia, recently. The situation among the 1,800 native inhabitants of Baffin island is reported as most gratifying. Their health generally is very good. The few cases of destitution in which relief had to be provided during the past winter were entirely those of old people. Practically all the native settlements on Baffin island were visited by members of the various Royal Canadian Mounted Police detachments during their patrols, and the natives are reported as being of a uniformly fine type, well nourished, generally free from disease, and contented. Food animals were plentiful, seal and walrus abounding. The fur catch was reported as small but this did not appear to have any detrimental effect upon the well-being of the natives, although there was naturally a diminution in the business of the traders. An epidemic among children had occurred during the winter in the native settlement around Frobisher bay. Thirty-five deaths resulted, mostly of children under five years of age. At the time the *Beothic* called at Lake Harbour, the nearest post, the outbreak had entirely passed and the natives were in excellent health and spirits.

This year's patrol to the northern islands left North Sydney on July 19 with Mr. George P. Mackenzie of the North West Territories and Yukon Branch, Department of the Interior, again the Officer in Charge. During the trip north and until the ship reached Pangnirtung, Baffin island, on its return trip, Dr. L. D. Livingstone was ship's doctor. Dr. R. M. Anderson, of the Geological Survey, Department of Mines, was naturalist; Mr. R. S. Finnie, secretary to the Officer in Charge; and Mr. R. T. Bowman, general assistant. Inspector A. H. Joy and a detail of members of the Royal Canadian Mounted Police were also on board. Captain E. Falk was ship's master and Captain J. D. Morin, ice pilot, and to their judgment and expert seamanship great credit is given for the success of this year's patrol. Mr. James Carlisle was wireless operator.

Weather conditions during the voyage of the *Beothic* were very much better than those prevailing during the 1927 patrol. Fog was encountered but in the main the weather was clear and bright, with many days rivalling in warmth midsummer days in more southerly latitudes. After leaving North Sydney, the *Beothic* encountered heavy seas in the gulf of St. Lawrence and the strait of Belle Isle. In Baffin strait and bay, ice retarded the progress of the ship but the only serious trouble was experienced when the expedition was in the vicinity of the post of Bache Peninsula, Canada's farthest north detachment.

Leaving North Sydney, the *Beothic* headed across the gulf of St. Lawrence. A rough sea was encountered during the night and the ship had to heave to to allow the deck cargo to be re-lashed. Fog off the Labrador coast necessitated slow progress but the expedition arrived safely at Godhavn, Greenland, early on the morning of July 26. The popularity of these 'good will' visits of the *Beothic* was seen in the enthusiastic welcome given to Mr. George P. Mackenzie and the members of the Canadian expedition. The local parliament, which was in session, was adjourned, and in the absence of the Governor on official business in Denmark, the visitors were the guests of the Acting Governor and other Danish officials. In the afternoon the Officer in Charge of the Canadian expedition was the host on board the *Beothic*, over 200 attending the moving picture show given on deck. The pictures shown were chiefly those taken during the previous annual patrol. The *Beothic* continued her voyage at five o'clock in the afternoon, reaching Pond Inlet, Baffin island, on July 30 Supplies and relief personnel were landed, and Inspector C. E. Wilcox, of the Royal Canadian Mounted Police, boarded the ship to accompany the expedition on the round of the posts in order, with Inspector Joy, to make the annual inspection.

The ship left Pond Inlet on the same day and reached Dundas Harbour, Devon island, on July 31. After reprovisioning this post, the *Beothic* was headed northward for the dash to Bache Peninsula on Ellesmere island. She arrived in Smith sound on August 8 and met with considerable heavy ice. In fact ice conditions were the worst encountered in years. Great pans of ice, miles in extent, of exceptional thickness, and piled mountain-high with snow, filled Buchanan and Flagler bays, closing all avenues of approach to the post of Bache Peninsula. The *Beothic*

(*Continued on page 3*)

Canada's Arctic Patrol—The steamer *Beothic* on which the 1928 expedition made its round of the posts in the northern islands. The ship is here seen in the ice in Buchanan bay en route to Bache Peninsula, Ellesmere island.

CANADA'S INDUSTRIAL PROGRESS

Hon. Charles Stewart Advances Practical Suggestions on how Development may be Promoted by Co-operation

During the course of a recent tour of the West, Honourable Charles Stewart, Minister of the Interior, paid special attention to western industrial development, and also took occasion to put forward some practical suggestions for greater and more widespread co-operation between his Department and the various civic and business organizations which, throughout the Dominion, are engaged in constructive effort to promote Canadian industrial development.

While the work of the Department of the Interior has long been known far and wide to the Canadian public by reason of its intimate connection with western land administration and settlement, there are several important aspects of its work—Dominion-wide in scope—that have been comparatively little known. For many years the Department has been continuously identified in a large way with promoting the development not only of agricultural lands but also of water power, forest, mineral and other 'industrial' resources. Throughout the country, as well as in the regions where it is directly responsible for the management of the public domain, the Department of the Interior has countless points of contact with the industrial phases of the Dominion's economic life and progress.

For instance, one division of the Department, the Dominion Water Power and Reclamation Service, administers the water rights of the federal domain, but its duties likewise call for the maintenance of such federal-provincial co-operation as is necessary to afford an adequate and up-to-date survey, in a national way, of the country's water-power assets and of the advances being made from year to year in their utilization. Similarly, in the field of forest resources and industry, another division of the Department—the Forest Service—is charged with duties that are likewise national in scope and in importance. Again, a third division, the Natural Resources Intelligence Service, forms a central Dominion bureau for information on Canada's resources and geography, and for the promotion of Canadian tourist and industrial development.

Uniting within a single organization these and several other divisions pursuing equally broad administrative or scientific duties in their respective fields of work, the Department of the Interior has in the course of years assembled and systematized a fund of information, unrivalled in its variety and extent, relating to the national estate and to its development possibilities and problems. And to the best of its powers the Department's activities have been and are being bent toward promoting the development of the country's resources not merely in a primary way but in such manner as will foster industrial growth and thus retain for the Dominion a full measure of the economic value of its natural products.

It is this latter phase of the departmental work that presents both the basis and the object of more extensive co-operation with local organizations engaged in helping to build up Canada's industrial structure, particularly with civic boards of trade and chambers of commerce, and with provincial agencies working with similar objectives. All these organizations, though occupying different fields and varying more or less in their specific duties, have the same main end in view—the strengthening and expansion of Canadian development. Through decades of administration and field investigation the Department of the Interior has placed itself in possession of a unique range of data upon the Dominion's resources and has, in addition, made it a prime concern to devote continuous study to the industrial utilization of the products of those resources. These facilities—of information and of investigation—Mr. Stewart now proposes to place more fully at the disposal and more readily within the reach of such boards of trade, chambers of commerce, and similar bodies as may wish to avail themselves of the Department's co-operation in their industrial development work.

It is fully realized that industrial growth in any community depends and always will depend primarily upon individual initiative and local enterprise. But in so far as its experience and

(*Continued on page 3*)

POLICE PATROL OVER 7,500 MILES IN ARCTIC

R. C. M. P. Officers Carry Out Duties in Severe Weather—Important Geographical Discoveries

Notwithstanding severe weather conditions—blizzard, fog, frost, and rain—detachments of the Royal Canadian Mounted Police stationed at posts on the islands and mainland in the Eastern Arctic sub-district carried out over 7,500 miles of patrol covering the less frequently visited parts of Ellesmere, Devon, and Baffin, and including Axel Heiberg, Graham, Buckingham, and North Kent islands. A number of important geographical discoveries were made during these long patrols, a census of the Eskimos in the areas visited was taken, game conditions were noted, and medical and other assistance was provided when necessary. Reports from the various detachments were received at the police headquarters in Ottawa following the return of the ss. *Beothic* from the annual patrol of Canada's Arctic regions.

At Bache Peninsula on Ellesmere island, the farthest north post, Constables E. Anstead, G. T. Makinson, and R. R. Garnett spent an adventurous year. In March, 1928, an attempt was made to enter the interior of the northern end of the island by Sawyer bay and Canon fiord to lake Hazen, but it was checked by the dangerous condition of a glacier which barred the way. On March 22, Constable Anstead left with two Eskimos on a patrol to the west coast which lasted until April 30, and accounted for some 850 miles. The pass from Flagler fiord to Gretha Bay fiord, on the west coast, is being slowly blocked by a glacier, and Constable Anstead, defying the alarm of his Eskimos, managed to squeeze through between the precipitous foot of the glacier and the cliff which constitutes the opposite side of the valley. The space was barely wide enough for them to pass, blocks of ice fell from time to time, and 500 yards of the trail was very dangerous. The men worked so hard that, though the temperature was 30 degrees below zero, they were bathed in perspiration. From the western coast, the party visited Axel Heiberg island, crossed Norwegian bay to Graham and Buckingham islands, skirted around North Kent island, and spent some time in the Bjorne peninsula on the return journey to the post. In the last-named locality at a point about 200 feet above sea level, several outcroppings of soft coal were found.

Constable Makinson made some interesting geographical discoveries during a patrol from the Bache Peninsula post down the east coast of Ellesmere island to Craig Harbour on the southern coast, and westward to Starnes fiord. He was accompanied by one Eskimo, and in addition to visiting an unmapped island east of cape Dunsterville, on which he noticed remains of native igloos, he found and explored a large fiord north of Clarence head. Travellers usually cut across on the ice, but Constable Makinson followed the shore, and discovered, first a large bay running southwest, and then a fiord two miles wide. An island in the middle of the former made the fiord difficult to notice from seaward. He also explored some fifty miles up the fiord and its branches. The party was absent from the post for 40 days and covered 700 miles.

From Pond Inlet, at the northern end of Baffin island, Inspector C. E. Wilcox made a patrol of 900 miles to Fury and Hecla strait; Constable S. H. G. Margetts aggregated nearly 1,300 miles during three patrols to Milne inlet, Arctic sound, and Home bay respectively; and Constable Cox made some shorter patrols to the height of land between Eclipse sound and Foxe basin. The most important trip was Inspector Wilcox's patrol to Fury and Hecla strait, this taking him to the northern end of Foxe basin and to Melville peninsula. He travelled across the interior of the northwestern part of Baffin island, traversing numerous lakes, and on one occasion climbing a frozen waterfall. About 150 Eskimos were visited, and they were generally prosperous, with plenty of food; the usual census was taken. In this region the caribou were quite numerous, and wolves were scarce. The journey was marked by a five-day blizzard, and the weather was so cold that the coal-oil, carried for fuel, froze and had to be thawed out by native oil lamps before it was used. Constable Margetts' patrol to Home bay, a matter of 51 days between April 12 and May 31, accounted for 945 miles. In this area, too, the natives were prosperous.

Weather was unfavourable for long patrols on Devon island in the vicinity of Dundas Harbour. However, two extended patrols were made, one across the island to Belcher point and the other westward to a place called Cuming creek and inland up the gorge of this watercourse.

From Pangnirtung, the post on Cumberland gulf, Baffin island, Sergeant O. G. Petty patrolled the gulf and visited native camps on the east coast of the island. The winter was unfavourable for travelling owing to conditions of weather and ice, nevertheless the entire district was patrolled by dog team, the distance aggregating 1,700 miles. One of the men, Constable G. J. M. Curleigh, patrolled to cape Mercy and remained there for some time hunting. He also made a journey with one Eskimo companion along the southeastern coast to Cornell Grinnell bay. A shortage of dog feed and frequent and severe storms made this trip a trying one. The party was absent 45 days and covered 640 miles.

The detachment at Lake Harbour on the southern coast of Baffin island was established during the winter of 1927-28 by Sergeant J. E. F. Wight, with Constable P. Dersch. The buildings were begun while the *Beothic* was in the harbour on last summer's patrol. After she left, the rain was incessant and it was six weeks before the policemen could go on with the work. As all the dogs had died in an epidemic, comparatively little patrol work was done. The total mileage was about 500.

At Port Burwell, at the entrance to Hudson strait, on the mainland, Corporal H. G. Nichols and Constable S. R. Montague were stationed. All of the native families along Ungava bay were visited and their health was reported as exceptionally good.

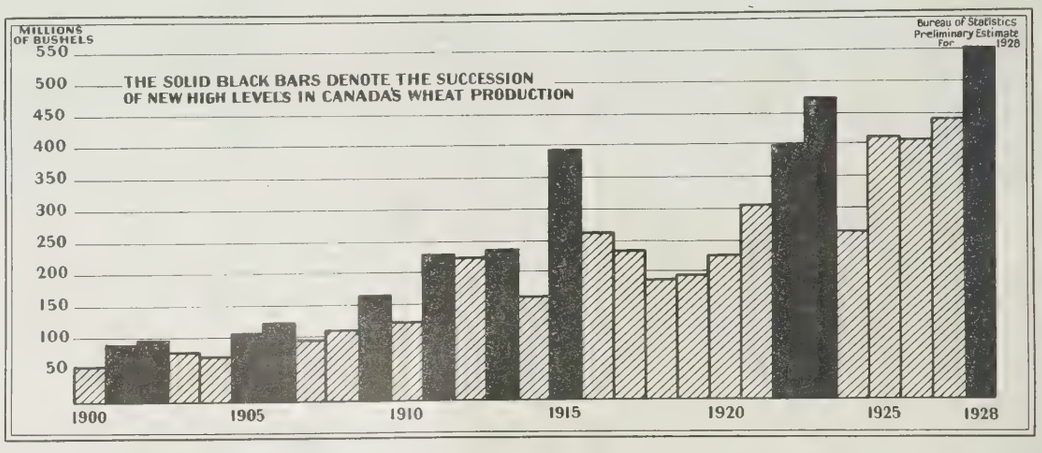
The police posts received instructions from Ottawa by radio and reception varied considerably. At Bache Peninsula, within 700 miles of the North Pole, it was fair; at Dundas Harbour and Pond Inlet it was good; and at Pangnirtung it was on the whole poor.

THE RISE OF CANADA'S WHEAT PRODUCTION, 1900-1928

Canada's rise to eminence as a wheat-producing country forms by all odds the most far-reaching feature of the Dominion's economic advance during the present century, and the preliminary estimates of this year's production, as recently issued by various authorities, indicate that the 1928 crop will, in volume, surpass all previous records. While the final results may vary considerably from the best early estimates, the preliminary report of the Dominion Bureau of Statistics forecasts a wheat harvest amounting to roundly 550,000,000 bushels.

The successive stages by which Canada has achieved its present immense volume of wheat production furnish one of the fascinating pictures of Canadian development. It is hard to realize that the wheat crop for the opening year of the twentieth century fell below 60,000,000 bushels and that not until 1905 did the harvest for the first time reach 100,000,000 bushels. In the ten years following 1905 new records were reached in almost every other year, culminating with the phenomenal crop of 1915. The 1915 harvest was literally a 'wonder' crop, and established a new mark which stood as the record for a longer period than any other crop since the opening of the century.

Finally, in 1922, the output of 1915 was exceeded, and in 1923 another heavy harvest set the record which held good for the following four years. Now, according to the best information, the 1928 crop has well exceeded the coveted figure of 500,000,000 bushels, and the Dominion has for the eleventh time since 1900 surmounted all previous high marks for wheat production.



From now on Canada can scarcely expect to establish new levels in wheat output as frequently as in the earlier years of the century, but it is assuring to know that the ultimate wheat-producing capacity of the Dominion, as estimated by the experts who have most carefully studied the country's land resources, is yet far from being attained.

PRECISE MEASUREMENT OF CANADA ADVANCES

Geodetic Surveyors Close Another Important System in Eastern Provinces—Method of Adjustment

The exact measurement of that part of Eastern Canada which roughly includes the St. Lawrence basin eastward from Montreal, Anticosti island, the gulf of St. Lawrence, and southward through New Brunswick and Prince Edward Island to the bay of Fundy, has at last been accomplished after years of patient labour. Apart from the ultimate removal of the unavoidable discrepancies which are bound to creep into such a complex subject, the task presented specially difficult features on account of the nature and position of the terrain.

Two systems of triangulation were used to bring the whole district into unity of measurement. The one system originated from two geodetic stations, Royal and Bellevue, in the vicinity of Montreal, and was extended down the St. Lawrence. The other system had its beginning from the United States points, Chamcook and Trescock Rock, Maine; and after traversing the bay of Fundy met the first system at the southeastern angle of New Brunswick. For a considerable time the Geodetic Survey of Canada, Department of the Interior, which had this matter in hand, had to employ the most accurate measurements and scrutiny of the effects of errors in order to tie in these two systems.

(Continued on page 4)

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OTTAWA, OCTOBER, 1928

CANADA'S 1928 ARCTIC PATROL

(*Continued from page 1*)

attempted to enter Buchanan bay through Rice strait but this also was temporarily closed by ice, and Captain Falk, the ship's master, had to find a way through the field to the east around Pim island. In this he was successful and the ship proceeded about five miles into the bay before it was again held up by ice. Members of the Royal Canadian Mounted Police detachment at Bache Peninsula, who had been hunting walrus in the open water in the lower reaches of Buchanan bay, met the ship at Rice strait, and went aboard.

On the second day after the arrival of the *Beothic* in Buchanan bay there was little change in ice conditions and it was deemed advisable to have the inspection of the post made, the mails exchanged, and changes in the personnel effected so that in the event of the post not being reached, supplies could be left at Fram Havn and the patrol continued. Inspector Joy with a party proceeded to the post by motor boat, which was able to navigate the comparatively open water between the pack and the shore, and carried out these duties, the trip requiring twenty-eight hours. The expedition, on the return of the party, took refuge in Fram Havn and remained there until the morning of the fifth day, when with conditions unchanged, the supplies were landed and the *Beothic* prepared to continue her voyage. The stores could be moved to the post by dog-team or if ice conditions improved, by the police power boat.

Little difficulty was experienced in getting the ship out of Rice strait, which had cleared of ice in the interval. However, in Smith sound, about ten miles from the south end of the strait, the further progress of the ship was barred by huge ice-pans, miles in extent. Captain Falk repeatedly sent the ship against the barrier but without much success for a time but finally a change in the wind and the action of the tide brought about a swinging movement of the ice and taking advantage of this, the *Beothic* was forced in between the milling edges of the pans, and after several anxious hours was steaming clear of the ice.

The ship continued southward, touching at Nerk settlement on the coast of Greenland, where two native families, who had been on duty with the police at Dundas Harbour, were returned to their homes. Craig Harbour, Ellesmere island, was the next point of call, and considerable supplies stored there were taken aboard between August 8 and 11 for distribution to other posts. The *Beothic* crossed Lancaster sound to cape Sparbo, Devon island, where moving pictures of a herd of musk-ox were secured. A second call was paid to Dundas Harbour, Devon island, on August 13, and Inspector Joy left the ship to make his temporary headquarters at this post. Continuing up Lancaster sound to Beechey island, the expedition established a cache for the use of Inspector Joy during his patrols next spring. Returning, Pond Inlet was again visited on August 15, being approached through Navy Board inlet. The ship continued south along the coast of Baffin island and touched at the Hudson's Bay Company's trading post and native settlement of Clyde River. Pangnirtung, on Cumberland sound, was reached on the morning of August 20. Dr. L. D. Livingstone disembarked at this point to establish headquarters here for his year's work among the natives of Baffin island. Before the ship sailed on the evening of the 23rd the framework of Dr. Livingstone's house had been erected, to be completed with the aid of the other residents at this post.

The next port of call was Lake Harbour on the southern coast of Baffin island, which was reached on the afternoon of August 25. Crossing Hudson strait the *Beothic* touched at Port Burwell, after which the run down the Labrador coast was begun. Without further incident the expedition arrived in the port of North Sydney on September 2, forty-five days after sailing on the northern patrol.

The 1928 patrol of the Arctic islands posts was a successful one and the reports brought back from the north were satisfactory. All of the posts were visited, re-provisioned, and considerable scientific and other data were collected during the voyage. The fact that the expedition did not land at Bache Peninsula was not unexpected. When the post was established officials of the Department of the Interior considered that if a supply ship reached that isolated point every second year the work could be carried on. Should it ever happen that Smith sound is closed with ice the officers and natives at Bache Peninsula would not suffer as the post has a reserve supply of coal and provisions sufficient for three years. However, since the establishment of this post in 1926, the *Beothic* has been able to reach its vicinity each year, sailing right in to the post last year and forcing her way to within a short distance of the objective this year.

Map showing the eastern portion of Canada's Arctic islands in which are located posts and points visited during the annual patrol just concluded.

Canada's Arctic Patrol—(Left) Captain E. Falk, master of the steamer *Beothic*. (Right) Mr. George P. Mackenzie, who was again the Officer in Charge of Canada's 1928 expedition to the Arctic.

Purpose of National Parks

Canada's national parks exist to render the best possible services to Canada and Canadians. Their establishment and development are based upon the idea that the Dominion's greatness as a nation depends not so much upon her natural resources as upon the quality of her men and women.

CONSERVING WILD BIRD LIFE ON THIS CONTINENT

International Conference Approves of Bill to Protect Winter Feeding Grounds

The question of adequate winter feeding grounds for the migratory bird life of the North American continent is one of vital importance to Canada. Migratory birds, and particularly wild waterfowl, which are hatched and raised in Canada, winter largely in the southern United States. The demands of settlement and development have seriously reduced the marshland areas in the southern states and for some years wild life conservationists to the south of the International Boundary have been directing attention to the serious shortage of winter feeding grounds for migratory birds. Recently a measure known as the Norbeck Bill was introduced in the United States Congress to provide for the establishment of bird sanctuaries where migratory birds may rest and feed during migration and where they may winter in safety. When these have been created and with the protection at present provided in both the United States and Canada by the terms of the Migratory Birds Treaty, bird life conservation on this continent, in the opinion of ornithologists, will have been materially advanced.

At the annual conference of International Game and Fish Commissioners, held in Seattle, Washington, from August 27 to 31, one of the important decisions reached was to support in principle the Norbeck Bill. Among the Canadian representatives at this conference were Mr. Hoyes Lloyd, Supervisor of Wild Life, Department of the Interior, Ottawa; Mr. J. A. Munro, Chief Federal Migratory Bird Officer for the Western Provinces; and Mr. M. B. Jackson, K.C., Chairman of the Game Conservation Board of British Columbia.

Another project which will have an important bearing on our wild bird life was outlined in a paper presented to the meeting on the work of the United States Biological Survey, in reclaiming marshes near Salt Lake, Utah. Some $300,000 is being spent in improving these marshes where vast numbers of waterfowl, on their migrations to and from Canada, stop to rest and feed. Heretofore very serious losses of waterfowl occurred in these marshes owing to the unhealthy conditions caused by the lowering of the water levels. Those attending the Conference were of the opinion that a reclaimed marsh area at this strategic point would undoubtedly result in a more abundant waterfowl supply in Western Canada.

CANADA'S INDUSTRIAL PROGRESS

(*Continued from page 1*)

facilities can be of service in helping to take stock of existing industrial development in any community, and in studying the resources and raw materials that appear to afford avenues for further development, the Department of the Interior is prepared to co-operate to the best of its ability with the organized efforts of civic business interests.

ZOOLOGICAL WORK IN THE ARCTIC REGIONS*

Very Satisfactory Results Obtained During Northern Cruise of "SS. Beothic"—Many Specimens Secured

Very satisfactory results are reported by Dr. R. M. Anderson, chief of the Division of Biology, National Museum of Canada, Department of Mines, who accompanied the Canadian Arctic Expedition of 1928 on the ss. *Beothic* as naturalist. The entire trip occupied forty-five days, of which a little over ten and a half days were spent in port at fourteen different places. Of the 255 hours available some were lost on account of bad weather and darkness during the latter part of the trip, but good collections were made, including 108 birds, 19 mammals, a small number of fishes and other forms of life, as well as many photographs.

Skulls of walrus, seal, and fox were collected at Nerk, on the northwest coast of Greenland, and a large series of birds at Hakluyt island, a famous sea-bird rookery in Smith sound, notable particularly for the little auk or dovekie. Dr. Anderson was not able to obtain many of the small land mammals, as trapping is impracticable during brief stops and under the midnight sun. The past year or two have been notable for a shortage of all the smaller mammals, particularly Arctic hares and lemmings. The lemmings occur at times in countless millions, forming abundant food for foxes, and their recurring periods of scarcity and abundance are reflected in the fur returns of the Arctic regions. The Arctic foxes, white and blue, constitute almost the whole fur trade of this region, and during the past winter very few foxes were captured, showing the importance of the reactions of even the smaller forms of life on those of commercial importance. A disturbance in the cycle of wild life in the Arctic produces ripples which affect conditions even in southern Canada and the United States, for the shortage of small mammals in the Far North brought down an unprecedented number of snowy owls and large hawks into civilized districts during the winter of 1926-27. These large birds of prey took an abnormally heavy toll of the partridges and prairie chickens of the southern districts at a season when the migratory birds had gone south and many of the smaller mammals were hibernating, or hiding under the snow. In connection with this, it may be noted that the birds of prey were also reported very scarce in the north during the past summer, and the observers on the *Beothic* did not see a single snowy owl, gyrfalcon, or large hawk during the trip.

A short time ashore on the north coast of Devon island, where a small herd of musk-ox was visible from the deck of the ship at a distance of about four miles, was of interest as showing the sedentary character of this herd, which has been noted on several previous occasions in winter on a small grassy area on the shore of this ice-capped island of glaciers. Two bulls were brought to bay by the efforts of one Eskimo and a single dog, and still and motion pictures were taken by members of the landing party, illustrating the ease with which this valuable animal has been exterminated in many of the valleys along the eastern seaboard where it was formerly plentiful. Dr. Anderson found encouragement in the fact that the North West Territories and Yukon Branch, of the Department of the Interior, and the representatives of the Royal Canadian Mounted Police are making special efforts to protect this valuable animal.

Material supplied by Department of Mines, Canada.

Zoological Work in the Arctic—Two musk-ox photographed by Dr. R. M. Anderson during the recently completed patrol of Canada's Arctic islands. These animals were separated from the herd found at cape Sparbo, Devon island, by an Eskimo with the aid of a dog. The picture shows the defensive formation adopted by musk-ox when attacked by wolves or other animals.

At Port Burwell, near the southern entrance to Hudson strait, five specimens of the Hudsonian white-footed mouse were captured. The occurrence is remarkable because this species is very rarely found beyond the limits of the timbered zone. Two specimens of the Labrador phenacomys were also taken here, a rare little mammal having a superficial resemblance to the lemming, not hitherto known north of Hamilton inlet, 500 miles farther to the southeast. Only 16 specimens are known to be extant, and none heretofore in Canadian museums or collections.

A very important part of the work consisted in getting data concerning the limits of the range of the different species of mammals, and this voyage gave exceptional opportunities for obtaining first-hand information from the traders at the different posts, many of whom had been stationed at other remote posts not visited on this trip. The various members of the Royal Canadian Mounted Police detachments, stationed at seven different posts, gave much information in regard to the occurrence of big game, sea mammals, and bird life in their districts, supplementing this with data on the life of the intervening country which is covered by their lengthy patrols. Several members of the Royal Canadian Mounted Police have made valuable collections for the National Museum. The present range and relative abundance of the Atlantic walrus, the Barren Ground caribou, Peary Arctic caribou, musk-ox, narwhal, white whale, ringed seal, harbour seal, harp seal, bearded seal, and hooded seal, and other species were checked and revised.

As a field zoologist, Dr. Anderson considers that he has never been able to accomplish so much in gathering both specimens and data in such a short time. This expedition, while carried out primarily for administrative purposes, serves many other useful ends through co-operation of different branches of the Government, and the National Museum of Canada benefits as a repository of scientific material of public interest and as a clearing-house for scientific data.

PRECISE MEASUREMENT OF CANADA ADVANCES

(Continued from page 2)

In human affairs perfection is not attainable, but the duty of the geodesist is to devise mathematical formulae by which the unredeemable error will be so distributed throughout the system as to be unappreciable. This has now been done, and another link has been forged in the precise measurement of Canada.

The difficulties encountered by the Geodetic Survey of Canada are those commonly met with by geodetic surveyors in vast countries like the Dominion. Maps represent portions of the earth's surface on a flat plane and the fact that the earth is spherical makes it necessary to reduce all geodetic measurements by mathematical process. Moreover, as every one knows, the earth is not a true sphere but a spheroid flattened at the poles, which makes the problem still more difficult. Again the surface of the earth is very uneven and broken into many formations—chaotic mountain lands with jagged peaks, valleys, gorges, and rolling plains. In geodetic measurements, every height, depth, and curve has to be taken into consideration, and whatever method is employed, the chief enemy all along is 'distortion' (alteration of shape of network of triangulation), aided and abetted by 'dispersion' (spreading or sprawling from a common centre). Both distortion and dispersion, as applied to geodesy, are largely the result of the curvature of the earth and changes in atmospheric conditions. They are fruitful of error on all occasions, no matter how alert the operator may be. However, in the detection and tracing of error, the geodesist has evolved correctives through the medium of mathematical formulae.

At the present moment, owing to the imminent joining up of the various sections of triangulation nets covering the surface of Canada, the questions of distortion and dispersion are bulking large in the Dominion's geodetic work, and during the coming winter the whole force of the research staff of the Geodetic Survey will be directed towards the solution of these involved problems. When this has been done the various measurements involved will be available for use as 'control' so that Canadian maps may be kept up to the high standard of accuracy demanded by modern usage.

HUNTING IS AN AUTUMN ATTRACTION IN CANADA

This Season Has Its Special Appeal in Dominion's Recreational Areas—Open Seasons Vary

Within every one of us there is something which thrills to the thought of a holiday spent in the great open spaces with the scent of pine and the freedom from the artificialities of modern life. It is possibly inherited from our pioneer ancestors, but nevertheless the urge to get back to nature for even a short time is exceedingly great. The gratification of such desires is possible at every season of the year in Canada. Winter, summer, spring, and autumn all provide opportunities for the enjoyment of recreative sport which in the light of present-day knowledge is so necessary to the well-being of the modern man and woman.

At this time of the year when the 'feel' of frost is in the air and the trees are taking on their autumnal tints, the out-of-doors seem to have an even stronger appeal. To the sportsman and hunter the lure is compelling and sons of Nimrod in thousands go trekking through the forest and lakeland areas of the Dominion in search of the lordly moose and the nimble deer. The hunting season in Canada is ushered in early in September and for several months the rigid protection provided the feathered and furred denizens of our vast hinterland is somewhat lessened.

In the wilderness areas of Canada which lie just beyond the settled portions of the provinces, the remnants of the wild life of the continent have taken refuge. Wise game laws and the co-operation of sportsmen and hunters are helping to conserve our wild life resources. National parks and forest reserves, by providing sanctuary for the wild life, are also aiding in this work, and the future of hunting in Canada for many years to come seems assured.

Generally throughout the Dominion, moose, deer, and bear may be hunted at varying periods between the first of September and the middle of December, while open seasons for caribou occur in Ontario, the Prairie Provinces of Manitoba, Saskatchewan and Alberta, and British Columbia. Ducks, geese, rails, brant, woodcock, and Wilson's snipe may be shot within certain periods, there being a slight variation in different parts of the Dominion. In general wild life matters are a responsibility of the provinces and the regulation of the taking of game animals is controlled by provincial law. Changes occur in the game laws from time to time as conditions require them and prospective hunters, in order that they may be furnished with the latest regulations, should communicate with the chief game official of the province in which they intend to hunt before starting out for their trip. The shooting of migratory game birds is regulated by the Migratory Birds Convention Act, which is based on the treaty entered into for the protection of water fowl and other valuable species of birds migrating north and south across Canada and the United States. Copies of the regulations under this Act may be obtained from the Commissioner of National Parks, Department of the Interior, Ottawa, or from any of the provincial chief game officers.

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AERIAL SURVEYS MADE OF LARGE AREA IN CANADA

1928 FLYING OPERATIONS NEARING COMPLETION

Topographical Survey and Royal Canadian Air Force Co-operate in Photographing 53,000 Square Miles

Civil flying operations are rapidly increasing in Canada, year by year, and one of the fields in which the most marked advance has been made is that of aerial surveying. The preliminary report for 1928 of the aerial photographic work for survey purposes done by the Topographical Survey, Department of the Interior, in co-operation with the Royal Canadian Air Force, shows in round numbers a total of 53,000 square miles of territory covered. Of this, 22,000 square miles was by vertical photography and 31,000 by oblique.

The operations extended into eight of the nine provinces of Canada for such various purposes as geological mapping, water-power investigation, determination of pulpwood and lumber resources, the preparation of topographical maps, and experimental work. The demand for mapping is very urgent and, for areas beyond the limits of present setlement, the oblique aerial photograph fits in well with present needs when maps on the scale of four or more miles to an inch are required. When greater detail and a larger scale in the resulting map sheets are necessary the vertical method is employed. Of oblique photographs three series are taken on each flight of the aeroplane —one straight ahead and one on each side—thus covering a very much greater area per flight than if the vertical method were used. In the latter case only one series of photographs is possible covering the territory immediately beneath the plane.

Of the 31,000 square miles covered in 1928 by oblique photographs 9,500 were in the vicinity of Kenora, Ontario; 14,600 in the valley of the Churchill river in Saskatchewan and Manitoba; and 4,400 in Alberta, north of lake Athabaska. As a result of this work several new and important map sheets of the National Topographic series on the scale of four miles to an inch will be issued by the Survey. Vertical aerial operations varied in size from the photographing of an area of 3,000 square miles to a matter of a few square miles only. There were fourteen operations covering individual areas of a greater extent than 100 square miles each and about twenty-five operations

(*Continued on page 4*)

CANADIAN DEVELOPMENT IN 1928

Dominion Advances on Many Fronts in Opening up Her Vast Natural Resources

Canada's record wheat harvest of over five hundred million bushels draws attention to the fact that agriculture is still the Dominion's leading industry but the remarkable progress which has been made in recent years in the development of her forest, mineral, water-power, and other resources shows that this country instead of confining her energies to a few extractive industries is making a broad-fronted advance in many fields of activity.

Canada's Pulp and Paper Industry—Aerial view of the Spanish River Company's pulp and paper mill at Espanola, Ontario, showing in the background the model town erected for the employees. This is a striking illustration of how the development of the pulp and paper industry is reflected in the growth of new towns. This picture, which was taken in the course of aerial surveys in 1928, also indicates the efficient results obtained by photographing from the air.

Ranking second to agriculture in value of products, our forest industries loom large in Canada's economic structure. The growth of pulp and paper production in recent years has been rapid and spectacular and since 1926 the Dominion has been the world's greatest newsprint producer. For the first eight months of 1928, Canadian mills produced 206,109 tons more newsprint than in the corresponding period of 1927, or an increase of 15 per cent. The erection of new mills and additions to present producers indicate that the Dominion's total will be further increased in the immediate future. The effect of expansion in this as in most of the other industries engaged in the development of the Dominion's natural resources is seen in the growth of our towns and cities and in the springing up of new communities. As typical of this growth the new 500-ton newsprint mill at Kapuskasing, Ontario, recently opened, is the centre of a model town planned and built for the employees of the operating company. Besides the mill buildings, covering seven and a half acres, three hundred and fifty houses have been erected, and the hotel, hospital, school and community hall are modern structures in every way. The town has about 5,000 inhabitants most of whom secure employment through the paper industry.

An increasing demand for lumber for export and a slight increase in price have brought about a general improvement in the lumber industry not only in British Columbia but also in the eastern provinces. The demand for British Columbia shingles is brisk and the mills are working to capacity.

The mining industry is thriving. Exploratory and prospecting operations are being carried on in practically every province of the Dominion, especially in British Columbia and in those areas underlain by the Pre-cambrian in the northern parts of the provinces of Quebec, Ontario, Manitoba, and Saskatchewan, and in the Northwest Territories. Extensive exploratory work, in which the aeroplane is rendering valuable assistance, is being carried on in the more remote parts of the country both east and west of Hudson bay, and these vast territories will soon be rendered more accessible by the completion of the Hudson Bay railway to Churchill. It is confidently expected that these activities, together with the developments that are going forward in other parts of the Dominion, will soon be reflected in a substantial increase in Canada's annual mineral output.

(*Continued on page 3*)

RAPID GROWTH OF OUR PULP AND PAPER INDUSTRY

REMARKABLE DEVELOPMENT IN TWENTY YEARS

Factors Which Have Contributed to Canada's Rise in This Industry

Twenty years ago 63 per cent of the pulpwood cut in Canada was exported to be manufactured into paper in the United States: to-day three-quarters of the cut is manufactured into pulp or paper at home and the amount of wood used in Canadian mills has increased from 482,777 cords to 4,387,687 cords or over 900 per cent.

Several factors have contributed to this remarkable growth in the industry, the most important being the increased demand for paper in the United States and the abundance of suitable timber and of water power in Canada. The consumption of paper in the United States has trebled in the last twenty years while the domestic production has increased less than 70 per cent. Situated favourably in relation to this market and possessing the necessary natural resources, Canada was naturally called upon to supply the greater part of this increased demand. In 1926, according to U.S. Forest Service statistics, Canada furnished in the form of pulpwood, pulp or paper, 44.5 per cent of the United States requirements for paper for home consumption and export, while only 42.9 per cent came from their own forests. In 1909, the imports from Canada consisted of 77 per cent unmanufactured pulpwood, 20 per cent pulp and 3 per cent paper. In 1926, they were 26 per cent pulpwood, 28 per cent pulp and 46 per cent paper. Markets for pulp and paper have also developed in Great Britain, Australia, New Zealand, Japan, the Argentine and several other countries.

Canada has been fortunate in having large supplies of pulpwood, especially of spruce, balsam and hemlock, within easy reach of this growing market. In 1924, the Royal Commission on Pulpwood estimated the total available stand of these species to be 436,200,000 cords with an additional 194,050,000 cords of jack pine and poplar. Including the lands considered inaccessible, the total stand of pulpwood species was placed at 1,418 million cords. Since that time the average annual depletion due to use for all purposes, and to fire, insects and decay is estimated to have amounted to 16,900,000 cords of spruce, balsam and hemlock and 6,500,000 cords of other species.

The numerous large rivers which drain the country not only supply cheap

(*Continued on page 4*)

THREE IMPORTANT HISTORIC SITES RECENTLY MARKED

COMMEMORATE EARLY WESTERN PIONEERS

Cairns and Tablets Erected at Lethbridge and in Jasper and Kootenay National Parks

Three sites of special interest and significance are among those which were this year marked by the Department of the Interior on the recommendation of the Historic Sites and Monuments Board of Canada. They keep green the memory of the heroic services of early pioneers who blazed new trails both in the actual wilderness and in the field of industry. The first perpetuates the memory of old Jasper House, the famous post of the Hudson's Bay Company, which for over half a century held the gateway to the Athabaska valley and the wilderness of the Rockies; the second commemorates the labours of Nicholas Sheran, the first man to vision Alberta's great coal industry and to initiate its development; the third honours the distinguished services and exploratory work of Sir George Simpson, Governor of the Hudson's Bay Company for forty years.

Jasper House recalls the stirring days of the great fur companies when the two vigorous rivals—the Hudson's Bay Company and the North West Company—were contending for the trade of the whole Northwest. By 1800 this contest was becoming keen. The North West Company were pushing along the Saskatchewan towards the mountains and already had visions of extending their trade beyond this formidable barrier. In 1811 David Thompson, the distinguished geographer, and one of their officers, had discovered the Athabaska pass and established a new route to the Columbia. A small post was built by the North West Company near the present site of Jasper town in Jasper national park, Alberta. The Hudson's Bay Company, awake to the situation, about 1813 established a post at the north end of Brulé lake, in the Athabaska valley, just outside the mountains. This came to be known as Jasper House, from Jasper Hawse, the first clerk in charge of the post. During the next few years the Athabaska valley became the most travelled route across the main range, and thousands of dollars' worth of furs crossed it each year. About 1836 Jasper House was removed to a site within the mountains almost directly opposite the wall of Roche Miette. The fort was occupied for about thirty years more and during the half century of its existence it gave shelter to many distinguished travellers who took the Athabaska Trail across the pass. These included Gabriel Franchere, Ross Cox, Alexander Ross, Paul Kane, the Belgian missionary Father De Smet, Sir James Hector, Milton and Cheadle, David Douglas, and many others whose names are imperishably engraved in the annals of early Canadian history. This monument which was unveiled on July 14 stands on the right bank of the Athabaska river, opposite the original site of Jasper House.

The monument at Lethbridge is unique of its kind because it commemorates the services of a pioneer in industry, Nicholas Sheran, the first man to grasp the possibility of what has now become a rich natural resource of Alberta. Sheran came from Montana with a trader in 1870 and on the Old Man river he saw his first vein of coal. The quality, however, did not please him and he prospected farther up the river until he found an outcrop that promised a harder grade and more permanent working. At that time, however, the Canadian Northwest was little settled and the problem of markets was a difficult one. Sheran filled a wagon with coal and drove his ox team two hundred miles south to Fort Benton, Montana, thus securing his first market. For the next four years he continued to make shipments along this route. Beginning in 1874 the North West Mounted Police established posts in southern Alberta, and Sheran was able to enlarge his industry by supplying them. As settlers arrived the business grew and when in 1879 Elliott Galt, Indian Commissioner, visited this region the mine was well established. Galt caught Sheran's vision and passed on the story to his father, Sir Alexander Galt, who became the founder of the North West Coal and Navigation Company, which began development of the great coal resources of Alberta on modern lines. The monument to Sheran was unveiled on July 18, in Galt Gardens, Lethbridge.

On September 20 the unveiling of another cairn commemorating the services of a pioneer in a different field of labour took place in Kootenay National Park, British Columbia. This pioneer was Sir George Simpson, famous Governor of the Hudson's Bay Company for over forty years. The ceremony was performed by the present Governor of the Hudson's Bay Company, Mr. Charles V. Sale, of London, England, who timed his tour of inspection so as to reach the park at the appointed date. It was largely through Simpson's efforts that the disastrous competitive struggle between the North West Company and the Hudson's Bay Company was finally brought to a close. Simpson entered the service of the latter company early in the century and soon saw the dangers involved in ruthless competition. When, in 1821, the amalgamation finally took place he was the logical appointee to the post of Governor of the united interests and his remarkable success in fusing the divergent interests and in establishing harmony and placing the whole trade on a firm and satisfactory basis meant a great deal to the development of the West. During his occupancy of the post Simpson travelled extensively, covering practically the whole of Canada from Labrador to the Pacific and from the International Boundary to the Arctic ocean. In 1841 his indomitable energy found a new outlet and he undertook his remarkable journey around the world. Leaving London he sailed to Halifax and Boston, travelled overland to Montreal and thence by canoe to lake Superior. At Fort Garry he fitted out an expedition and continued on horseback across the prairies to Edmonton. Here he obtained the services of a half-breed named Peechee, who offered to show him a new route into the Rockies. This was what is now known as Peechee Gap, about ten miles north of the Canadian Pacific Railway main line. Simpson passed by lake Minnewanka, forded the Bow and crossed the Rockies by what is known as Simpson pass. He then descended the Simpson river to the Vermilion and the Kootenay and followed the Columbia river to the Pacific coast. After inspecting the coast from Alaska to California and visiting the Hawaiian Islands, he sailed from Sitka to Okhotsk, Russia, and from there travelled across Siberia and European Russia to St. Petersburg; thence to London, completing his whole journey in nineteen months and twenty-six days. After his return to Canada he again took up the affairs of the company and administered them with remarkable enterprise and success until his death in 1860.

Making Safe Canada's Water Highways—View of a lighthouse buoy tender in the service of the Department of Marine and Fisheries putting overboard a 7-ton gas buoy.

PETROLEUM PRODUCTION CONTINUES HIGH IN ALBERTA

Output in July and August, 1928, Greater Than for Corresponding Periods Last Year

Petroleum production in Alberta during the months of July and August, 1928, was considerably greater than in the corresponding periods last year. In August last, the production of naphtha from the Turner Valley field exceeded that of any previous month since the field was 'brought in.' Light crude production has fallen off somewhat but the value of the product is the highest yet reached. Heavy crude production was lower owing to a fire which put the Wainwright refinery out of action. The following figures were compiled from returns made by operators to the Department of the Interior:—

	Naphtha (brls)	Light Crude (brls)	Heavy Crude (brls)	Total (brls)
July, 1928.	35,522	8,709	770	46,001
July, 1927.	22,619	5,224	10	27,853
August, 1928 . ..	39,351	6,979	121	46,451
August, 1927.. ..	23,279	5,595	529	29,403

Willingdon mountain with a height of 11,044 feet and situated in latitude 51 degrees, 45 minutes and longitude 116 degrees, 15 minutes on the Clearwater river, Alberta, is named after Viscount Willingdon, the present Governor General of Canada.

MAKING SAFE CANADA'S COASTS AND WATERWAYS

Important Work of Department of Marine and Fisheries—Many Ingenious Signal Devices

With regard to shipping and navigation, particularly in respect to equipping her coasts with danger signals for the protection of mariners, Canada stands in a unique position among the nations of the world. While inland navigation in most maritime countries is relatively speaking much less important than the sea-borne carrying trade, that of the Dominion equals in significance her ocean traffic. As a result of the volume of this fresh-water shipping it is incumbent on the Government of Canada to maintain watch and ward not only over Canada's three sea-girt coasts but also throughout her many lakes and rivers including her share of the Great Lakes system which is one of the international water highways of the world.

The work entailed is enormous. Every detail brings its own big responsibility—for instance, the question of lights and lighting, light-ships, gas buoys, whistling buoys, and lanterns. The amount of lighting fuel is no small item, but it is to be remembered that the conservation of oil and gas used in the innumerable buoys strung thousands of miles on end to flash their warnings to the mariners has been carried by the Department of Marine and Fisheries to a fine art, and has brought into being many ingenious devices.

Viewed from the deck of a steamer, a gas buoy on the St. Lawrence or on the sea-coast may not appear to be of any great size, compared with its surroundings. However, the coast buoys actually range in weight from 7 tons to 19 tons, and the river buoys, like those around Quebec, are from 6 to 8 tons and are some 9 feet in diameter.

There are three systems of gas buoys. The first is known as the oil-gas or "pintsch" system. The gas is purchased from the factory in steel containers, 9 inches in diameter and 6 feet long, and is at a pressure of 1,500 pounds to the square inch. Under this pressure the gas is liquid. When a buoy is to be charged with gas, a hose is connected from the steel container to the body of the buoy, and by turning a tap the gas is allowed to expand in the buoy until a pressure of 150 pounds to the square inch is obtained. Thus charged the buoy is ready for five months' service.

In the second system acetylene dissolved in acetone is used. The acetylene acetone is purchased from the factory in steel containers in various sizes, ranging from 100 pounds to 1,200 pounds. Containers of appropriate size are inserted into corresponding pockets in the buoy, and one or more containers may be used in each buoy according to the requirements of the locality. In respect of power of light required and the duration of time, the river buoys are equipped for the entire season and the coast buoys from 12 to 15 months.

In the third system carbide (calcium) is introduced into the buoy. The buoy is so designed that when placed in the water, water in suitable quantities enters the carbide chamber, attacks the carbide, and generates acetylene. According to requirements, the charges of carbide are made to last from 9 to 15 months.

Lanterns are used in all the three systems of buoys, and here it is that the

(Continued on page 4)

NATURAL RESOURCES CANADA

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OTTAWA, NOVEMBER, 1928

CANADIAN DEVELOPMENT IN 1928

(*Continued from page 1*)

Outstanding developments now in progress include those undertaken in the Sudbury district of Ontario which involve the immediate expenditure of millions of dollars, and those proceeding in the northern Manitoba-Saskatchewan boundary region. A great deal of work is also being done in the Rouyn and adjoining areas in western Quebec. In the Kirkland Lake district of Ontario aggressive policies have resulted in the gold output of this camp reaching a record high total with a value of more than $6,000,000 for the first half of the year, and the situation in the other provinces is, on the whole, very satisfactory.

The prospective output of the mining industry is a factor which cannot be ignored in formulating any estimate of Canada's economic future. At present, according to the latest available statistics, there are 10,256 mines, metallurgical works, oil and gas wells, quarries, cement, lime and brick plants, and other units actually engaged in mining and allied operations within the Dominion, representing an estimated capital investment of over $700,000,000 and giving permanent employment to more than 80,000 workers. In 1927 the net value of sales from these various industries reached $248,385,031, or 4.6 per cent more than the total for the previous year. In the field of copper production alone Canada in 1927 attained fourth place among the world's greatest producers of this metal. The Dominion is also forging ahead in the production of gold, lead, and zinc, and still retains first place among the world's producers of nickel, cobalt, and asbestos.

The development of Canada's water-power resources continues apace. Notwithstanding the gigantic undertakings which have been completed in recent years new projects are adding to the total installations year by year. The expansion of the forest and mining industries, in which hydro-power is playing a large and increasing part, has contributed to the demand for more electrical energy. The outstanding water-power undertaking brought to completion this year was the new transmission line from Fitzroy Harbour on the Ottawa river to Toronto. This line, which was built by the Ontario Hydro-Electric Commission, links up at the Ontario-Quebec provincial boundary with that from the Paugan Falls plant of the Gatineau Power Company. On October 1, the first delivery of power (80,000 horse-power) was made and this will be gradually increased during the next three years until the full load of 260,000 horse-power is reached. The initial installation of six 34,000 horse-power units at the Paugan Falls development was also completed this year. Several other projects of major importance have been put in operation during recent months. In New Brunswick the first of three units of 20,000 horse-power capacity in the Grand Falls development of the Saint John River Power Company was placed in operation on October 1. This constitutes the largest single development in the Maritime Provinces. In Quebec an addition of 43,000 horse-power has been made by the Shawinigan Water and Power Company to its plant on the St. Maurice river and the Canadian Northern Power Company has installed two 10,000 horse-power units in their Quinze River power-house. The Ontario and Minnesota Power Company has completed its third plant on the Seine river where 13,200 horse-power is being produced, and the Spruce Falls Company has put in operation its initial development of 56,250 horse-power at Smoky Falls on the Mattagami river, Ontario. In Manitoba, 56,000 horse-power has been added to the development by the Manitoba Power Company at Great Falls on the Winnipeg river. This brings the development to its ultimate designed capacity of 168,000 horse-power.

During the first seven months of 1928, 172 miles of new railway were put into operation by the larger companies of Canada. Since the compilation of these figures other railway projects have been materially advanced, and in some cases completed, so that a considerable increase may be expected in the above figures by the close of the year. One of the most important projects recently completed was the branch line from the Pas, Manitoba, northwestward to the Flinflon mining area. In this undertaking new and radical methods of construction were successfully employed with the result that the line was completed and in operation more than three months before the contract time. In order to accomplish this the rails for the first fifty miles were laid on the frozen ground and after the supplies for the remaining part of the road had been transported, the work of raising and ballasting the first portion was proceeded with.

The year 1928 marks a period of rapid growth in the economic structure of the Dominion and on every hand there is evidence of the progress being made in exploration, development, and production.

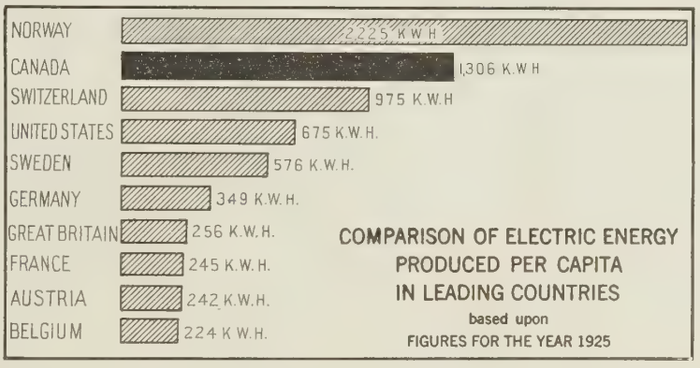
CANADA'S RANK IN PRODUCTION OF ELECTRICAL ENERGY

The actual installation of electrical generators in various countries does not give a reasonable comparison of the importance of electrical energy in these countries because it takes no account of population or territorial dimensions. For this reason comparisons on a per capita basis provide a more accurate picture of the situation.

In May, 1927, statistics on the production of electrical energy were presented at the International Economic Conference at Geneva and were issued as a publication of the League of Nations. These statistics, which are for the year 1925 and were compiled from the best available sources, have been reproduced this year by the United States Commerce Reports and by the *Electrical World* which added the data for the United States; the figure for Canada was compiled from Canadian official statistics. The populations used in the calculations are for 1925 where obtainable and otherwise are the latest official figures.

The production of electrical energy during 1925 in Canada was 1,306 kilowatt hours per capita, second only to Norway which produced 2,225 and well ahead of the next in line—Switzerland—with 975.

It is interesting to note that the five countries which lead in the per capita production of electrical energy are predominantly water-power countries and easily surpass such highly industrialized nations as Germany and Great Britain which have to rely principally on fuel for the production of power. The pre-eminence of Norway is mainly attributable to the large consumption of electricity in the production of nitrates from the air or, as it is called, the "Fixation of Nitrogen."



GRAZING ON DOMINION LANDS

Over Half a Million Head of Live Stock Pastured During 1927

During the year 1927 there were in existence on Dominion lands in the provinces of Manitoba, Saskatchewan, Alberta and in the Peace River Tract and the Railway Belt in the province of British Columbia, some 9,777 grazing leases covering an area of approximately 6,607,183 acres.

Returns received in the Department of the Interior for the year 1927 in connection with these leases indicate that 263,742 head of cattle, 127,782 horses, and 123,068 sheep, or all told, 514,592 head of live stock were pastured on lands covered by these government leases.

COLLECTED VALUABLE DATA ON COAST ESKIMO

Explorer From Department of the Interior Visits Settlements Along Canada's Arctic Coast

Canada, through the Department of the Interior, is keeping a watchful eye on the well-being and advancement of the Eskimo population of the Dominion's Arctic coast and islands, and every opportunity is being taken to increase our knowledge of conditions among these native wards. While *en route* to the region around King William island, where he will carry out a number of important investigations, Major L. T. Burwash, of the North West Territories and Yukon Branch, conducted a survey of Eskimo conditions as he proceeded by boat along the coast between the mouth of the Mackenzie river and Hudson bay. Valuable information concerning the various settlements was collected and considerable material on wild life was also obtained. Major Burwash reached Cambridge bay on the southeast coast of Victoria island on August 31 and after replenishing his supplies proceeded to the west coast of Boothia peninsula where he will establish his winter camp in the vicinity of the magnetic pole.

Advice of the progress of Major Burwash's work was contained in a wireless message received by the Director of the North West Territories and Yukon Branch from Cambridge bay, through the Hudson's Bay Company's steamer *Baymaud,* which is equipped with a strong wireless set.

Early in June this year, Major Burwash left Ottawa for Edmonton from which point he began the long trip to Aklavik in the delta of the Mackenzie river. The Department's auxiliary power schooner *Ptarmigan,* which was brought down from Great Slave lake, was turned over to him at Aklavik and about the beginning of August he began the trip eastward along the Arctic coast.

From his winter base on Boothia peninsula Major Burwash will carry out his investigations around King William island and on the mainland. A survey of the proposed tractor route between Cockburn and Wager bays will also be made. This project is being investigated with a view to ascertaining the possibilities of bringing supplies for posts on the Arctic coast in by way of Hudson bay and overland by tractor from Wager bay to Cockburn bay, rather than by the present long and hazardous route via Behring sea and the northern coast of Alaska.

In May, 1929, Major Burwash will sail northward on board the *Ptarmigan* to investigate navigating conditions in Franklin strait and Peel sound, continuing on to the post of Dundas Harbour on the south coast of Devon island, where he hopes to meet and join the annual Canadian Arctic expedition in the summer of 1929.

HARVESTING CANADA'S RECORD GRAIN CROP

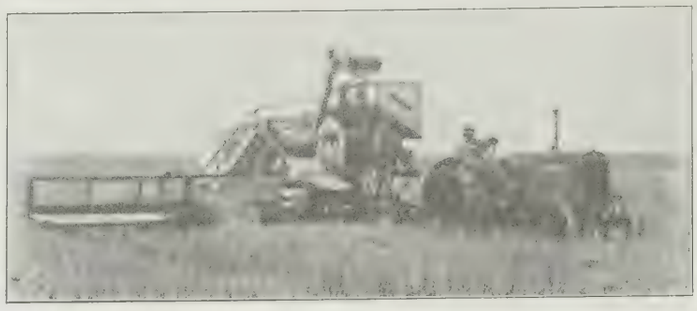
The 'Combine', Reaper-thresher, Largely Used in 1928 Wheat Harvest

Much has been heard this autumn of the 'combine,' the agricultural implement which by cutting and threshing the grain in one operation has expedited the harvesting of Canada's great wheat crop, but the fact has not been brought out that the use of this machine in certain parts of the Prairie Provinces has been made possible not only by mechanical improvements but also by the development of wheats which ripen earlier than those once universally grown. The combine is not suited to all prairie districts, nor to all farming conditions even in districts where generally useful. This is recognized by all interested in prairie agriculture but notwithstanding this the increase in the number used in harvesting the crop of 1928 as compared with those employed in 1927 has been very great. It is stated that in 1927 the number of combines in the prairies was less than 500, whereas in 1928 estimates place the total at ten times that number. Exact figures cannot be given because many of the machines were delivered only a few days before the opening of harvest.

The combine gets its name from its combination of the functions of reaping and threshing. One part of the implement cuts the grain, high up so as to take little more than the heads. The cut portion is then passed to the threshing-machine section and threshed out. The grain is delivered into a tank on the upper part of the machine and thence flows into the box of a wagon or truck which, while it is being filled, keeps pace with the combine. As each wagon is filled it is replaced by another and the full wagon is driven to the granary, or to the elevator on the railway line if the distance is not too great. At the elevator the wagon is placed on a grated, moveable platform and emptied in a minute or less by being tilted backward, so that the grain pours out into a hopper underneath the platform from which it is raised by an endless chain of buckets into the bins of the elevator.

One of the subsidiary reasons for the sudden increase in the use of this implement is the new 'swather' or windrow harvester. The swather is a wide reaper which cuts the grain in a strip from twelve to sixteen feet across and lays it, unbound, in swaths or windrows to be later picked up and threshed by the combine. Since these swaths are kept from touching the ground by the 'shelf' of tall stubble on which they lie, the air circulates freely all around the heads permitting them to ripen perfectly, if somewhat green, and allowing them to dry out in case of rain. The saving in time, labour, and cash is obvious since the grain is not bound into sheaves, then stooked on the ground, and later drawn to a central point and threshed, as is otherwise necessary.

The combine is not new in principle. It was used in the southwestern parts of the United States and in Australia thirty years ago, and specimens have been exhibited and their workings demonstrated in the Prairie Provinces many times previous to the last decade. Individual machines were owned in Saskatchewan as early as 1908. Generally speaking, however, farmers, even



Harvesting Canada's Record Wheat Crop.—A scene in a western wheat field showing a 'combine' in action with an attachment for picking up the swaths of grain. A greatly increased number of these improved reaper-threshers were used in the Canadian West this year.

those who had as many as eight or ten binders on their farms looked at the machine in those days but refused to buy. The chief objection was that in the Prairie Provinces the wheat then sown ripened so late in the season that part of the crop had to be cut while still "on the green side" and allowed to ripen in the stook. This difficulty has been overcome by the use of the swather and by the development at Canada's experimental farms of Marquis, Garnet, and other varieties of wheat which ripen from two to three weeks earlier than the old Red Fife variety almost exclusively sown previous to the introduction of Marquis.

The year 1922 may be considered as marking the advent into the Prairie Provinces of the improved combine under present-day conditions. In that year a 12-foot motor-driven machine was put into active services on the Dominion Experimental Station at Swift Current, Saskatchewan, thence onward the advance in its use was gradual until the great upswing of this year.

Thus by the research work of the wheat specialists of the Department of Agriculture, coupled with that of inventors and mechanics, not only has the northern limit of the wheat belt been pushed poleward many score miles but the introduction of labour-saving machinery, enabling the cutting and threshing of wheat to go on simultaneously, has also been rendered possible, and this in turn has speeded up the transportation of the crop to the markets of the world.

RAPID GROWTH OF OUR PULP AND PAPER INDUSTRY

(Continued from page 1)

transportation for pulpwood, but in their descent from the highlands provide a wealth of power, for the initial development of which the pulp and paper industry has been largely responsible. Only 11 per cent of the recorded water-power resources have so far been harnessed and of this the pulp and paper industry uses nearly 21 per cent.

The movement of the paper industry to Canada during the last few years is illustrated by the records of newsprint production published by the News Print Service Bureau.

Newsprint Production in Canada and the United States

Year	Canada Tons	United States Tons
1922	1,081,961	1,447,688
1923	1,266,232	1,485,000
1924	1,352,994	1,481,425
1925	1,522,217	1,530,318
1926	1,831,737	1,684,218
1927	2,086,949	1,485,495
1928 (8 months)	1,546,343	944,601

In 1926, Canada became the greatest newsprint producer in the world and her exports of newsprint exceeded the newsprint exports of all other countries combined. In the export of wood pulp Canada is surpassed only by Sweden.

In 1927, the total cut of pulpwood was 5,929,456 cords of which 26 per cent was exported to the United States, realizing $15,702,705. The balance was manufactured into pulp and as such had a value of $114,442,541. We exported 876,904 tons of pulp, the equivalent of about 23 per cent of the pulpwood cut, for which $46,996,041 was secured. About 51 per cent of the pulpwood was made into 2,468,691 tons of paper worth $168,445,548. Approximately 1,940,000 tons of paper worth $129,637,687 was exported. Altogether our exports of pulpwood, pulp, and paper brought $192,336,435 into the country and as the imports of pulp and paper goods amounted to only $12,877,071 the industry provided a favourable trade balance of $179,459,362. In addition there was left for home consumption or stock on hand about 529,000 tons of paper worth $38,807,861.

The net value created in the utilization of the pulpwood was $231,144,294—an average of $38.98 per cord. The advantage of carrying the manufacture of the raw material as far as possible is shown by the average price per cord received for the various products. The pulpwood exported brought $10.18 per cord, the pulp exported $34.40 and that manufactured into paper $55.75 per cord.

Not including the amount invested in timber and in logging equipment, the 113 manufacturing plants represent a total investment of $579,853,552, provide employment to 32,876 people who receive $45,674,293 for their services. The woods operations which are largely confined to the winter months, provide employment to a still greater number. As measured by the value added to the raw materials through manufacture and by wages distributed, the pulp and paper industry has become the most important manufacturing industry in the Dominion.

MAKING SAFE CANADA'S COASTS AND WATERWAYS

(Continued from page 2)

Department's conservation policy is much in evidence. The lanterns are equipped with burners suitable to the gas used, and lenses magnify the power of the light evolved. By a device similar to that in a domestic gas meter, the supply of gas is cut off at predetermined intervals. These intervals are varied according to local requirements, and a further saving is effected through the storage of gas in such large potential quantities in small structures.

Another gas saving device of particular interest is known as the sun valve. This clever invention in effect causes the sun to light and turn off the gas in the buoys without any other aid. Advantage is taken of the expansion of metals under the heat of the sun, the arrangement being such that, as certain metal connecting rods contract or expand, valves which regulate the gas are opened or closed. Thus the gas supply is turned off during daylight hours which results in a large saving especially in northern latitudes.

NORTHERN ONTARIO LAKE HAS ODD NAME

Lac des Mille Lacs is a Body of Water Studded With Hundreds of Islands

Lac des Mille Lacs, meaning in English "lake of the Thousand Lakes" is the strange name of a large body of water some 60 miles northwest of Port Arthur, in the Thunder Bay district, Ontario. If a map of the region is examined, according to the Geographic Board of Canada, it will be observed that the lake is studded with islands. In fact, Arrowsmith, who made maps for the Hudson's Bay Company, calls the lake "Thousand Islands lake" on maps which he published in 1846 and in 1854. However, on the map which he prepared in 1865 to illustrate the report of the Palliser Expedition to Western Canada he placed the name lac des Mille Lacs. The curious thing is that the report itself relates how the explorers entered the "lake of the Thousand Isles" at five o'clock on June 25, 1857 and next day continued their way along the lake threading among its thousand islands. The report adds that "the islands are composed of rounded masses of granite rock, but little elevated above the lake."

From the foregoing facts, the natural conclusion would seem to be that the name, lac des Mille Lacs was originally a misprint for "lac des Mille Iles," overlooked by subsequent map makers. However fuller investigation shows that the name, lac des Mille Lacs, occurs much earlier than 1846, for records of the North West Company of 1802 and David Thompson's map made in 1813-14 show that it was the name then generally in use. For what reason this name was used has not, up to the present, been discovered by the Geographic Board of Canada.

AERIAL SURVEYS MADE OF LARGE AREA IN CANADA

(Continued from page 1)

of lesser size. By provinces the amount of vertical aerial work carried on to date during the season was as follows: Nova Scotia, 2,090 square miles; New Brunswick, 870; Quebec, 8,470; Ontario, 5,000; Manitoba, 1,680; and British Columbia, 3,890 square miles.

Work was done for the departments of Public Works, Mines, National Defence, and for the following branches of the Department of the Interior: Forestry, National Parks, the Dominion Observatories, and Water Power and Reclamation.

One of the striking features of the season's operations was the taking of vertical aerial photographs of the Lac Seul area and their use in connection with the creation of a reservoir to regulate the flow of waters in the Winnipeg and English rivers, for the development of power. This is another instance of the value of aerial photographs in the furthering of engineering projects in which large areas are involved. By ordinary methods a survey of the Lac Seul area to determine the extent of country which would be affected by the project would have entailed some two or three years' work. However, with the aid of vertical aerial photographs taken during the past summer the whole area was mapped in a little over three months and the actual construction of the immense storage dam is now being proceeded with.

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NORTHERN PLAINS WELL SUITED TO REINDEER GRAZING

INVESTIGATORS COMPLETE TWO-YEAR SURVEY

Domesticated Herds Would Improve Conditions Among Natives—Huge Herds Could Be Supported

The proposal to establish reindeer herds in Northern Canada as a source of food and clothing for the native inhabitants was advanced another step with the recent completion of the investigations of Messrs. A. E. and R. T. Porsild, botanists and biologists sent out by the North West Territories and Yukon Branch of the Department of the Interior. During their two years' survey, the investigators covered an immense area in Alaska and Northern Canada and in their judgment large parts of the great northern plains and adjoining tracts of open timbered land between the Coppermine and Mackenzie rivers are eminently suited for domesticated reindeer and will support vast herds of deer.

The introduction of high-powered rifles among the natives and the keen competition for furs have tended to seriously deplete the numbers of fur-bearing and other game animals and, in certain districts, have also changed the native mode of living, so that it is more and more approximating that of the white man with its dependence on outside supplies of food and clothing. These conditions are a cause of anxiety to the officers of the Department of the Interior and various measures have been taken to meet the situation. The proposal to establish herds of reindeer on the great northern plains is looked upon as a possible solution of the problem and the decision of Honourable Charles Stewart, Minister of the Interior, in the matter will depend considerably on the report of the Messrs. Porsild.

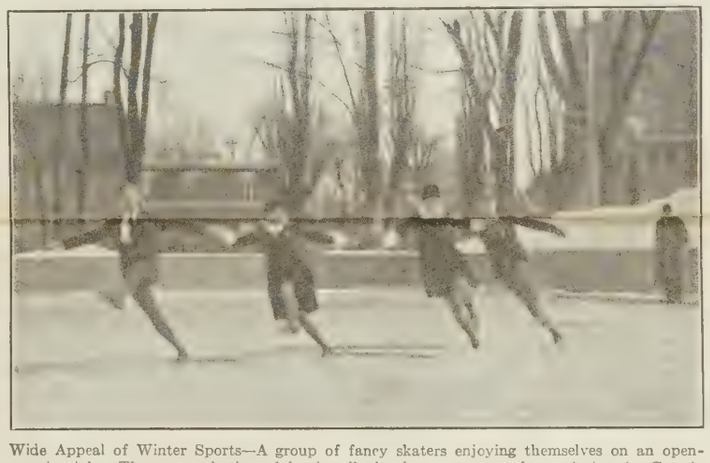
The Porsild brothers travelled, in round numbers, 14,000 miles through Arctic territory in their two years' stay in the North. During that time they encountered perils and hardships including a trying period in midwinter when they had to subsist on dog feed after their fuel and other supplies had given out. The investigators began their work at Fairbanks, Alaska, in June, 1926, and after extensive investigations at this point moved westward and northward along the coast visiting the principal herds in that region. Later they started eastward along the ice-bound northern coast of Alaska to

(*Continued on page 2*)

WIDE APPEAL OF WINTER SPORTS

Recreation in the Open in Canada at This Season is Healthful and Enjoyable

Winter is pre-eminently outdoor sports time in Canada. At this season of the year the appeal of the outdoors is especially persistent for the sports lover. Many and varied forms of amusement are enjoyed. Skating, skiing, hockey, snowshoeing, tobogganing, and curling all have their thousands of devotees, who thus refresh mind and body in the crisp, invigorating air. Gradually the gospel of recreation in the open spaces is spreading to less favoured climes and each year sees growing numbers coming to Canada for enjoyment of winter pastimes.



Wide Appeal of Winter Sports—A group of fancy skaters enjoying themselves on an open-air rink. There are skating clubs in all the large centres of population in Canada and in them there are developed some of the most graceful skaters in the world.

Health and fun are the principal magnets of the winter play idea. The artificial conditions and nervous strain of modern life make it important that people play outdoors and the need for this is greater in winter than in summer. Steam-heated houses, offices, and schools; travel in crowded trains and cars; and the great increase in sedentary occupations need to be balanced by bodily exercises comparable to the numerous duties and 'chores' which kept the last generation active out of doors. Lively play is a tonic for tired nerves and bodies at all times and in Canada in winter it has the added joys of ozone-ladened, pine-scented air, brilliant sunshine and the speed and zest of sport amid surroundings of glistening ice and powdery snow.

Canadians early realized the value of recreation in the open in winter time and they have developed to a high degree an ability to extract the most from this season. The period from December to March is now no longer one during which most of the time is spent indoors. The interruptions to building operations caused by frost are being overcome and most of the construction activities of the summer season are carried on throughout the winter months. The outdoor play idea has gone far to popularize our winter season and Canadian youth—and this term covers many past the midway mark in life—live much in the open and find as much enjoyment in the season's pastimes as they do in summer sports.

Canada has always been noted for her winter sports and these have such a wide range that people of both sexes and of almost all ages can take part in at least one of them with benefit and enjoyment. Hockey is a fast, strenuous game that is played only by the youth of the land, but curling, with an appeal akin to golf, counts its enthusiasts among those past middle life. Skating, snowshoeing, skiing, and tobogganing can be as strenuous or as leisurely as the participant desires. Ice-boating is also a popular diversion in parts of Canada where the peculiar conditions required prevail. Dog-team racing is now an attractive feature of every carnival program.

A gratifying characteristic of winter sports in Canada is that they all tend to develop players rather than spectators. With the exception of hockey, only a short apprenticeship need be served before the participant enters into the full enjoyment of the game. The fun to be had while the novice is becoming familiar with his skis is one of the chief factors in the rapid rise to popularity of this sport.

(*Continued on page 4*)

PLANTING TREES ON FARMS IN WESTERN CANADA

WIDESPREAD INTEREST IN THIS MOVEMENT

Nearly 8,000,000 Trees Ready for 1929 Distribution—Applications Being Received for Following Year

Each year greater interest is being shown in the planting of shelterbelts on prairie farms in Western Canada and preparations now being completed for the 1929 distribution by the Department of the Interior from the Dominion Forest Service nursery stations at Indian Head and Sutherland, Saskatchewan, point to next spring as one of the busiest in the history of the work. The advent of the autumn freeze-up has brought to a close another very satisfactory season's operations. Approximately 8,000,000 seedlings and cuttings have been safely 'heeled in' for winter storage, and beginning in May these will be sent out to about 10,000 applicants. Last spring about 7,500,000 trees were shipped out from the two nurseries bringing the total to slightly more than 100,000,000 for the twenty-eight years since the inauguration of free tree distribution to prairie farmers by the Dominion Government. Reports of the inspectors indicate that at least 83 per cent of the plantations set out in these years are in good growing condition.

It is particularly interesting to note the greatly increased demand for conifers during the past few years. Such hardy evergreens as white spruce, Scotch pine, lodgepole pine, and jack pine have proved particularly adaptable for prairie planting. After they have become established they are able to withstand long periods of drought and do not require as much attention as common broad-leaved trees. During the first twenty years the height growth of the evergreen is about the same as that of the Manitoba maple but after that time they grow more rapidly and reach a very considerable height. Evergreens are used chiefly for planting inside of and to re-enforce already established broad-leaved belts by planting in single or double rows or in closely set groups or clumps. Thus they provide a much denser and more effective windbreak than if only species which drop their leaves in the autumn were used, and their green colouring strikes a cheerful note in the winter landscape.

The facilities for growing evergreens at Indian Head are at present somewhat limited and as a result it is impossible to meet the demand for these species.

(*Continued on page 4*)

THE ARTIFICIAL SILK OR RAYON INDUSTRY

Dominion Has Essential Materials for Large Development—Facilities for Research Important

Canada has the essential materials for a large artificial silk or rayon industry and its growth holds out great possibilities both in the enhancement in value of forest resources and in the development of an industry producing a highly manufactured product requiring skilled personnel. In her vast forest wealth is the raw material for the manufacture of cellulose and in her great water-powers lies the energy needed for the economical production of the cellulose and the important chemicals required in the manufacture of artificial silk. Great forest and water-power resources in close proximity to centres of population place Canada in an important position in the rayon producing field. The significance of such development may be indicated by the value of the world's production of rayon which in 1927 amounted in round figures to $300,000,000.

Careful consideration must be given to the development of this young industry in Canada. With the gradual perfecting of different processes of manufacture, economic considerations will necessitate a careful study of the future supply of raw materials. At present over half of the cellulose pulp used in the manufacture of viscose rayon is produced in Canada from Canadian spruce. A few years ago cotton was the only available source of cellulose of sufficient uniformity for rayon. Refinement in the methods of manufacture of sulphite pulp from wood has caused it to be favoured to-day but research work is continuing with a better cellulose as the object. The beautiful fibre of spruce is invaluable for paper but it is not absolutely essential for rayon. Chemical purity, rather than shape or size of fibre is the primary consideration in the production of rayon. Cornstalks, straw, and waste hardwoods are all possibilities as sources of raw material.

Power resources are an important factor in the rayon industry. A ton of viscose rayon requires, besides a ton and a half of cellulose pulp, about two tons of caustic soda, plus considerable amounts of other chemicals. Caustic soda is generally produced by an electrolytic process, and can be readily manufactured in Canada. Ten per cent of the world's production of caustic soda now goes to the rayon industry. Cellulose acetate or "celanese" rayon requires large quantities of acetic acid, acetone, and related chemicals. One Canadian company manufacturing celanese produces all the chemicals required in its own plant.

In the light of the present status of the rayon industry in Canada, it is well to consider its history to date. It was not a chance discovery which brought to the world this beautiful textile material but rather long, patient research by chemists and engineers. Leon Bernicaud, Count of Chardonnet, the father of the artificial silk industry, took out his first patents in France in 1884 and opened his first factory in 1885. Cross and Bevan, English chemists, secured the original patents for the viscose process in 1892 and for the acetate process in 1894. In 1904 the United States rights for the viscose process sold for $2,500; to-day, 80 per cent of the world's rayon is made by this method. The comparatively long interval between the discovery of rayon and its appearance on the market in commercial quantities was due: (1) to the great amount of development work of a chemical and engineering nature required before volume production was possible and (2) to the advent of the Great War which diverted the attention of chemists and engineers engaged on rayon research to the more immediate problem of explosives.

The future of the rayon and related industries in Canada is not only dependent on vast resources of wood and power but also on facilities for scientific research in connection with raw material for manufacture. The Pulp and Paper Division of the Forest Products Laboratories of Canada by co-operative agreement between the Department of the Interior and the Pulp and Paper Association is now established in the same building in Montreal with the Department of Cellulose Chemistry of McGill University. Thus Canada is placed in a unique and favourable position for the development of this highly important industry.

Canada's Northern Plains Well Suited to Reindeer—Views taken during northern survey. (Left) Winter feeding grounds inland in the area east of Mackenzie River delta. (Right) Summer range along the Arctic coast east of the delta. (Inset) A typical specimen of the domesticated reindeer.

NORTHERN PLAINS WELL SUITED TO REINDEER GRAZING

(*Continued from page 1*)

Aklavik in the delta of the Mackenzie river, which point they reached in April, 1927. From Aklavik they began their investigations in the Northwest Territories during which they discovered grazing grounds superior in many respects to those in Alaska. In the area along the coast, between Mackenzie and Anderson rivers, grazing grounds, covering 15,000 square miles and capable of supporting 250,000 reindeer, were examined. Later their investigations took them into the regions east of Great Bear lake, around the Dismal lakes and along the Coppermine river, and into that northward from Great Bear lake to the headwaters of the Horton river.

In their preliminary report the investigators recommend that, if it is decided to establish reindeer in the Canadian north, the first herd should number about 3,000 head. These would be brought from Alaska, and would be herded along the northern route followed by the Porsilds during their trip eastward in 1927. Four herders and a number of reindeer dogs would be required for this work. The movement would begin about October 1 and continue until the following April when a halt would be made to allow for fawning. Only a short distance could be covered during the summer and the movement would be resumed again in the autumn. By the following spring the herd would have reached the mouth of the Mackenize and crossing on the ice the animals would be established in their new range before the spring fawning season had again arrived. The advantage of reaching the grazing grounds at this time of the year is that reindeer have a strong homing instinct and the young animals born that spring would tend to settle the herd on the new range.

Photograph of one of the dog team outfits used by the investigators during the trip eastward along the northern coast of Alaska. The sail greatly aided the dogs over the smooth stretches of snow and ice. The wheel attachment recorded the distance travelled.

Under favourable conditions a reindeer herd will double in size in three years and as the original herd increases new herds could be established north and east of the Great Bear lake. Later, if it be so decided, the work could be carried further eastward to the Clinton-Colden Lake area, to the region around Baker lake, and to the west coast of Hudson bay.

Not since the beginning of the present century has there been such activity in prospecting and exploration in the Northwest Territories as in the present year. Mineral development which will undoubtedly follow these intensive surveys, will bring a large new population. The present inhabitants and those that will come with future development would provide a market for the surplus meat from the proposed reindeer herds while the new industry was being established among our northern natives.

SOLVING MOMENTOUS WESTERN LAND PROBLEM

Minister of the Interior Gratified With Effect of Act Respecting Seed Grain Liens

Hon. Charles Stewart, Minister of the Interior, is gratified with the results of the legislation respecting liens on certain classes of western lands which he obtained from Parliament in the session of 1927.

By the work of committees set up by this Act (The Crown Debts Act) liens and other financial obstructions to operation placed on lands in certain areas during the dry years following 1914 to attempt to insure repayment of advances for seed grain and fodder, are being adjusted. It is expected from what Hon. Mr. Stewart learned from his study of the working out of the plan while in the West, that a number of farmers who might have been forced from the land will be encouraged to remain as a result of these adjustments, which are being made at no cost to the settler for the legal process, and that areas which have been tied up and non-productive can now be disposed of to those who will put them to the use for which they are fitted.

As explained in Parliament, where the bill was fully discussed, there was a rapid advance of settlement, especially from 1912 to 1915, into areas in southeastern Alberta and southwestern Saskatchewan, formerly devoted to ranching. The extremely dry years following 1914 experienced by this district seriously crippled these new settlers and in order to assist them, especially in view of the need for increased food production caused by the war, grants of seed grain, fodder, and other forms of relief were made during the winter of 1914-15 and the following spring. The area, however, has proved too dry for grain farming, although suited to grazing, and while considerable portions of these loans were repaid the result as a whole was that grain farmers moved to other districts and much of the land was tied up by the liens for advances by the federal and provincial governments and by loan companies. Some settlers, who had remained, desired to secure additional lands to get a sufficient acreage for grazing, and others were anxious to come in to undertake the pasturing of cattle. Both were prevented by the existence of these liens.

Joint committees representative of the Dominion and the provinces interested have been investigating and reporting upon the matter and already the Treasury Board at Ottawa has considered a large number of these reports and has authorized apportionment or adjustment of indebtedness, thereby relieving many parcels of land of incumbrances that were preventing the carrying on of farming or grazing operations. By these means it is expected that production will be encouraged and the wealth of the country increased.

Forest Fire Costs

Canada's bill for forest fire losses amounts to more than $1.50 a week for every man, woman, and child of the population. Federal and provincial governments are putting forth efforts to reduce and eventually wipe out this heavy loss.

NATURAL RESOURCES CANADA

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HON. CHARLES STEWART,
Minister

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Deputy Minister

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OTTAWA, DECEMBER, 1928

MINING ACTIVITY IN PRAIRIE PROVINCES

Noteworthy Advance During Past Season —Department of the Interior Encouraging Development

The past season has witnessed a noteworthy advance in the mining development of the pre-Cambrian area of the three Prairie Provinces and the Northwest Territories. The progress of the Flin Flon Mines in preparation for the construction of their 3,000-ton smelter, the proving up of huge ore reserves on the Sherritt-Gordon, the expansion in the so-called Central Manitoba field, the construction of the railway to the Flin Flon mine in record time, and the extension of the Hudson Bay line to within striking distance of Churchill, the broad area which was covered in both canoe and aeroplane by the many prospectors who visited this field and the many new discoveries which were made, all bear witness to the substantial foundation which is being gradually and firmly laid for a huge mining industry in this virgin area and to the keen interest taken by the mining public in these northern regions, the resources of which are administered by the Department of the Interior.

The activities of the Flin Flon and the Sherritt-Gordon mines are now well-known to the general public but few appreciate what the development of these properties will mean to northern Manitoba and Saskatchewan. The urban centres alone which will spring up in the vicinity of these mines in a few years will rival long-established communities in older parts of the country. The expansion of the Central Manitoba field east of lake Winnipeg, with its one gold producer—the Central Manitoba Mines—contemplating increased output, and its many newer properties giving promise of early production, has also received considerable attention. Little, however, is known of the work accomplished by that large army of prospectors who have penetrated this vast country from all sides. Some have traversed by canoe the dangerous rapids of streams never before seen by white man, while others have travelled by aeroplane and made trips which, though not spectacular, almost rival in daring trans-Atlantic flights.

Some have been disappointed that another Flin Flon, Sherritt-Gordon, or Noranda has not been found this year. It must, however, be appreciated that mines are not developed or proven in a day or even in a year and that each one of the above large properties looked very doubtful in its early stages and was unfavourably reported upon at various times by competent mining men. To those who maintain a true perspective of local mining conditions and activities, the great number of new finds in one short season over such a wide area can only be interpreted as holding out exceptional promise for the mineral possibilities of this region. Among the minerals found this past season are gold, silver, copper, zinc, lead, and nickel. Many recently located geological formations giving indications of mineral deposits have also been reported. Discoveries have been made as far south as the Winnipeg river and almost as far north as the Arctic ocean. From east to west these finds extend from the Hudson bay to the Rocky mountains. The area included within these boundaries is over 1,000 miles square. Its vast extent indicates to the most casual observer that the surface has not yet even been scratched.

It does not require any great stretch of the imagination to visualize in some measure at least the mineral possibilities of this region and to realize what its development will eventually mean to the industrial expansion of the Dominion. The Department of the Interior is striving in every way to foster and encourage this promising growth, by satisfactory regulations, adequate technical supervision, accurate and detailed maps, reliable geological information, encouragement of private enterprise, and by guaranteeing the maximum benefit to the public good. Under these circumstances it is not unreasonable to anticipate that this area will develop into one of the premier mining areas of Canada.

Columbia, a Great Icefield

The extension of 980 square miles, made to Jasper national park, Alberta, in 1927, brought the Columbia icefield within national park boundaries. This giant icefield, one hundred and twenty-five miles in extent, which is the mother of more than a score of glaciers, is surrounded by a galaxy of giant peaks and represents the very climax of the scenic and alpine features of the Rockies.

CORNERSTONES OF CANADIAN DEVELOPMENT

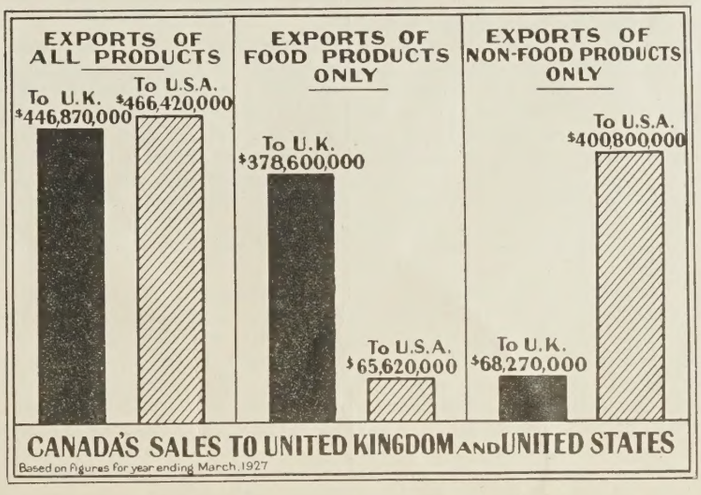
Progress in the development of Canada's resources during the twentieth century has been built largely upon export trade—upon success in finding ample markets abroad for the products of the Dominion's farms, factories, forests, mines and so on. And the two great cornerstones of Canada's export trade are furnished by the markets of Great Britain and the United States.

Normally the British and United States markets together take about three-quarters of Canada's exports. Until recent years the United Kingdom was regularly our heaviest customer, but latterly the United States has assumed that role. The accompanying diagram is based upon figures issued by the Department of Trade and Commerce for the year ending March, 1927, and in that year 37·3 per cent of our total sales abroad went to the United States and 35·7 per cent to the United Kingdom. None of the numerous other countries, with which the Dominion trades, takes as much as five per cent of our exports.

The diagram brings out a striking contrast between British and United States purchases. Our sales to the United Kingdom consist chiefly of food products and only to a minor extent of other classes of goods. Exactly the reverse applies to the United States. Non-food products—such as paper, minerals and lumber—account for over four-fifths of our sales to the United States and food products for less than one-fifth.

The joint effect of these widely different demands upon Canada's resources has been to give the broadest kind of impetus to the Dominion's economic expansion. The huge buying power of the British market has been the dominant commercial factor supporting the development of our food-producing resources, while the United States market has played a similarly striking role in other fields.

With these two giant forces—the two greatest buying powers in the world—combining in such a remarkable manner to draw upon Canada's resources of various kinds, the Dominion's prospects for broad and versatile development rest upon a commercial foundation of unique strength.



IMPORTANT CHANGE IN LANDS REGULATIONS

Minister of the Interior Solves Problem of Cancelled School Lands Sales

During his recent western trip, the Minister of the Interior has conferred with the Governments of the three Prairie Provinces relative to the administration of School lands which the Department handles as a sort of trustee for the provinces of Manitoba, Saskatchewan and Alberta, the revenue derived being set aside for educational purposes.

One of the vexatious problems with which the Department of the Interior has had to contend has arisen from the failure or inability of some purchasers to fulfil their contracts. In some of these cases a portion of the land is broken and sown and when the purchaser relinquishes his purchase, or the Department cancels the sale for default, this area becomes a potential weed menace, unless it is kept under cultivation. The Department has met this situation heretofore by issuing yearly cultivation permits at fifty cents an acre but the provincial authorities find that with this yearly type of tenure, it is impossible for municipalities to enforce their scheme of weed control, and that in many cases it has been impossible to collect the taxes. It is further apparent that fifty cents an acre is a very small return for the use of broken land and that the carrying charges of any sale at anything approaching average land value would be considerably more than fifty cents per acre.

Inasmuch as it is the duty of the Dominion Government to collect for School Lands Endowment the maximum amount that can be obtained for the purpose for which the lands were set aside, it has been decided that in future where sales are cancelled the lands will be valuated immediately and advertised for sale. On the date mentioned in the advertisement, the Agent of Dominion Lands for the district will proceed to the nearest town and hold the sale.

PETROLEUM PRODUCTION IN ALBERTA DURING SEPTEMBER

Output Figures for This Period in 1928 Higher Than for Corresponding Month Last Year

A statement of petroleum production in Alberta during the month of September, 1928, with comparative figures for the same period last year shows that there was a considerable increase this year. These figures were compiled from returns received by the Department of the Interior from the operators. The comparative table follows:—

		Naphtha (brls)	Light Crude (brls)	Heavy Crude (brls)	Total (brls)
September,	1928....	32,752	6,905	175	39,832
September,	1927....	22,805	3,371	52	26,228

Jasper Golf Course

One of the finest eighteen-hole golf courses on the North American continent is to be found at Jasper Lodge, in Jasper national park, Alberta. The entire course is set in a mountain location that provides very beautiful views from practically every one of the eighteen holes,

COAL LEADS PRODUCTS OF NOVA SCOTIA MINES*

Gypsum and Salt Hold Important Places—Renewed Interest in Gold Mining

Mining is one of the chief lines of industrial activity in Nova Scotia and coal is the chief mineral product; next to coal comes gypsum, then salt. Iron ore is no longer mined having been completely displaced in the local iron industry by ore from Newfoundland. The past few years, however, have seen a marked revival of interest in Nova Scotia gold mines.

Much the greater part of Nova Scotia's coal output comes from the Sydney coal-field in Cape Breton island, which is not only the largest in the province, but the most highly-developed and productive in the Dominion. The recently completed No. 1 B. shaft of the Dominion Coal Company, sunk primarily for the winning of undersea coal, is one of the best examples on the North American continent of the application of modern devices and methods of permanent construction to the needs of the coal miner. It is estimated that the life of this shaft will be at least 125 years and possibly 200 years; and that before it is abandoned some 140,000,000 tons of coal will have been hoisted through it. Though the Sydney coal-field is the most important in the province, there are also important productive fields in Cumberland and Pictou counties on the mainland.

Gypsum was mined in Nova Scotia as early as 1829, but it is in recent years that the industry has had its most remarkable expansion. The present output of over 800,000 tons annually is more than three times that of all the rest of Canada. Gypsum deposits containing an excellent grade of material are widespread in the central and eastern parts of the province and are extensively worked in a number of localities. The chief producing centre is in the vicinity of Windsor, in Hants county, though there is an increasingly large output from a number of quarries scattered over Cape Breton island, and the Canada Cement Company have recently opened large quarries in Antigonish county, on the mainland. In spite of the large production very little gypsum—less than 2 per cent of the output—is calcined in the province, nearly all of it being shipped to United States points.

Salt mining is the third most important and youngest mining industry in Nova Scotia. Commencing with small shipments in 1919 the value of the annual output is now well over $100,000. Malagash Salt Products, Ltd., at Malagash, Cumberland county, is the only producer. Parts of the Malagash saltbeds are so pure that excellent commercial grades of salt can be obtained by simply crushing and screening the rock as it comes from the mine. During the present year the company has added an evaporator to its plant, by means of which the less pure portions of the beds also can be utilized and the finest grades of domestic salt added to its commercial products. An interesting feature of the Malagash salt beds is the presence of potassium salts, which may ultimately be found in sufficient quantity to make their recovery profitable.

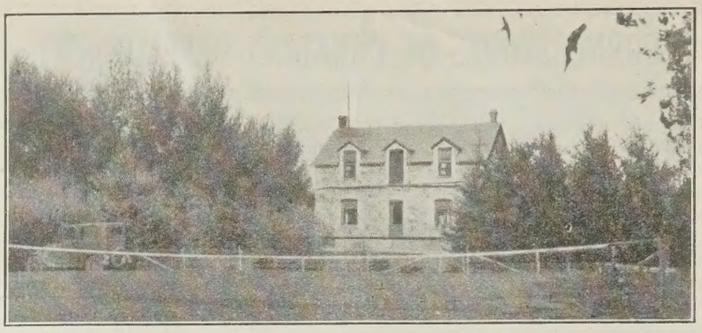
Gold mining has had a distinct revival in Nova Scotia during the last few years, and operations are reported on a dozen or more old mines. Production, however, is still limited to a few thousand ounces annually. There is a marked tendency towards the consolidation of properties with a view to more economical and systematic development.

Diatomaceous earth, a material extensively used as a heat insulator, for the purification of oils, etc., has for many years been extracted in a small way in Colchester county by the Oxford Tripoli Sales Company. This year a second company, Scotia Diatom Products, Ltd., has opened extensive deposits and started producing similar material near Little River in Digby county.

Zinc and lead do not yet appear in the list of Nova Scotia's mineral products but are likely to be listed shortly. Since early in 1927 the British Metals Corporation of Canada, Ltd., have been developing a zinc-lead prospect at Stirling, Cape Breton, and now announce that sufficient ore has been put in sight to warrant the erection of a 200- or 250-ton flotation mill for its treatment. The shipping products will be zinc concentrates and lead concentrates.

There is much activity in the investigation of known occurrences of copper, lead, zinc, and tungsten in various parts of the province, of tin at New Ross, and of auriferous antimony ore at West Gore in Hants county, and it is not unlikely that some of these prospects will in due course add to Nova Scotia's total mineral output.

Prepared at the direction of Dr. Charles Camsell, Deputy Minister, Department of Mines, Canada, by Mr. A. H. A. Robinson, Mines Branch.



Tree Planting on Farms in Western Canada—A cosy and substantial farm home in the Prairie Provinces well protected by trees supplied by the Department of the Interior.

PLANTING TREES ON FARMS IN WESTERN CANADA

(Continued from page 1)

On that account not more than 100 evergreen trees are supplied to each applicant. A nominal charge of $3 per hundred is made. Farmers are coming to realize that, contrary to the opinion once generally accepted, evergreens are not difficult to grow and a few hundred of these trees add to the general attractiveness and effectiveness of a farm plantation at all seasons of the year.

Throughout the Prairie Provinces of Manitoba, Saskatchewan, and Alberta, the effect of tree planting is seen in the well sheltered homes, gardens, and orchards. The growing of certain varieties of small fruits, both small and large, and of fine vegetables is becoming more general. Interest is spreading rapidly and the annual distribution is larger each succeeding spring. With arrangements completed for the 1929 shipment, applications are now being received from those who are planning to set out shelterbelts in 1930. Applications for stock for this work should be made not later than March 31, 1929, to the Forest Nursery Station, Indian Head. Inspectors will visit the farms of applicants during the next summer and give directions as to planting and care of the young trees. The basis of this distribution is co-operation—the Government supplying the trees and planting advice, and the farmers the land and the labour—and the success that has attended the movement is due to the harmonious carrying out of this plan.

THE NORTH AMERICAN DATUM—ITS MEANING

Harmony Promotes Efficiency in Triangulation of North American Continent

The measurement of the continent of North America is not merely a scientific mensuration of so much territory, but provides a striking object-lesson on the amity of nations. In the highly technical work of geodetic measurement, it is obvious that in North America for the highest results in economy and efficiency one basis or system should be used by the countries involved, namely, Canada, the United States, and Mexico; and it is mainly owing to Canada's attitude that this happy event has been brought about.

The United States had adopted as the basis for their geodetic work the formula of Clarke, the English mathematician, and had fixed upon Meade's Ranch in Kansas as the initial point which most fully approached ideal conditions from a geodetic point of view. It was quite within the rights and abilities of the Dominion to establish a datum of her own, but, as individual systems would lead inevitably to discrepancies at the international boundaries, the Geodetic Survey of Canada decided to accept the datum established by the United States as described above. Had this not been done, North America would have been in the same plight as Europe, where the selection of a different datum by each nation has rendered any work in connection with comprehensive continental surveys enormously difficult and exceedingly and unjustifiably expensive.

Therefore the term North American Datum is used to designate the condition of harmony with resultant efficiency in the scheme of triangulation by means of which the continent is measured. Thus, it may be said that triangulation is based on the North American Datum when it conforms to Clarke's calculations of the size and shape of the earth, and is joined up or linked up with all the triangulation which emanates from Meade's Ranch. By this arrangement the officers of the geodetic surveys of Canada, the United States, and Mexico co-ordinate their activities with resultant advantages not only in time and labour but also in international goodwill.

REDUCE BUFFALO HERD AT ELK ISLAND PARK

Another Instance of Canada's Success in Bringing Back the Buffalo

A gratifying feature of Canada's adventure in bringing back the buffalo is the way in which the different herds continue to multiply and to expand beyond the capacity of their once ample grazing ranges. The case of the main herd at Wainwright, Alberta, in which there was an increase from about 700 head to 17,000 head in eighteen years has often been cited. This year 1,088 young buffalo were sent from Wainwright to the Wood Buffalo park near Fort Smith, Northwest Territories, and of the herd at Elk Island park, two hundred animals have been slaughtered and their carcasses and hides disposed of commercially. That two hundred buffalo could be disposed of without wiping out the entire herd at Elk Island park will surprise most people who have not closely followed this experiment. Nor is this surprise to be wondered at. When the original herd was purchased from Michael Pablo, speedy action had to be taken to receive them. Seventy miles of stout wire fencing, such as encloses the Buffalo park at Wainwright, could not be erected overnight and the first shipment received from Montana was placed in Elk Island park, a fenced wild animal enclosure, fifty-one square miles in area, about 37 miles northeast of Edmonton. As soon as the fencing at Wainwright was completed the shipment was moved to the Buffalo park but about fifty head which could not readily be rounded up were left at Elk Island to roam with the deer, wapiti, and other animals there. These few animals throve like those at Wainwright and this summer a survey showed that the fifty buffalo had increased to about eight hundred. This number, considering the other animals in the park, was felt to be beyond the grazing capacity of the area and the disposal of two hundred was deemed advisable.

Unexpectedly keen interest has been shown by citizens in the fact that nutritious buffalo meat in limited quantities and a few choice robes and heads are from time to time available but attention is chiefly centered in the success achieved in bringing back the buffalo in the prairie regions and in the establishment of a great herd in the far north where the one-time lord of the plains will play a large part in the development of Northern Canada.

WIDE APPEAL OF WINTER SPORTS

(Continued from page 1)

From year to year the spell of Canada's winter season is becoming greater and not only in the Dominion but abroad growing numbers are heeding the varied appeals of our northland pastimes. Health and enjoyment in far-flung fields amid vistas of great scenic beauty, is the lure by which growing throngs are being drawn to our snow-bedecked forests and hills.